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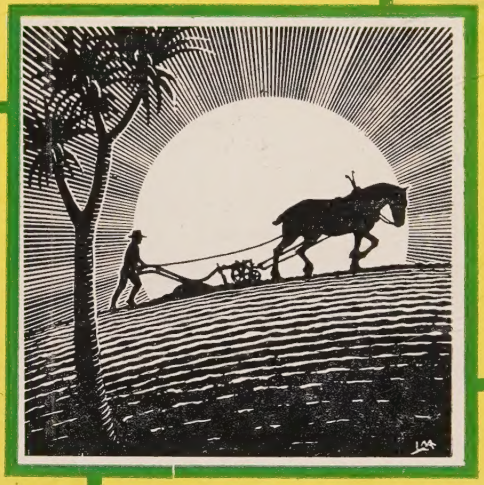

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The New Zealand Journal of Agriculture

Published by direction of the Hon. W. LEE MARTIN, Minister of Agriculture.

Vol. 59 WELLINGTON, 16th OCTOBER, 1939. No. 4

Farmers' Part in the War

Appeal by Minister of Agriculture for Increased Production

THE conflict in which the British Empire is engaged calls for extra effort and additional sacrifice from each and every one of us. Not only must we strive to maintain the activities of peace, but it is also imperative that we fulfil the urgent demands of war.

In peace, the New Zealand farmer is one of the most important suppliers of food to the United Kingdom market. In war, he has a duty not only to keep up those supplies, but also to help the Mother Country to replace sources of supply which have been curtailed or cut off by war conditions.

Food is just as important as armament in winning victory on the battlefield. Therefore, the slogan of New Zealand farming must be "PRODUCTION AND STILL MORE PRODUCTION" of those great essentials, meat, wool, butter and cheese, which will be required by Great Britain in ever-increasing quantities for her safeguarding and success.

THERE MUST BE NO HAMPERING OF PRODUCTION, NO SLACKENING OF EFFORT, NO WEAKENING OF THE WILL TO WIN.

Already the Government has received pledges of assistance from farmers and farm workers' organisations, the Young Farmers' Club movement, and commercial and industrial enterprises connected with our farming industries, and I can assure those who have placed their services at our disposal that they will be called upon instantly the need arises.

I have set up a Council of Primary Production to organise our farming activities on the most efficient basis for the needs of the war. This Council is representative of the principal farmers' and workers' organisation, and they have come together imbued with the one objective—to win a victory for those principles of democracy and liberty of thought and expression which constitute the very foundation of our welfare.

There are three main avenues along which the Council must proceed. The first is the organisation and direction of farm labour for normal and special seasonal requirements. The second is the maintenance of farm production of both crops and livestock, and the third is the organisation of the supply of farm materials so that prices may be reasonably controlled, and that, in

From an actual photograph sent in by one of our enthusiastic clients.

Here is a palatable, balanced and specially prepared food that is easily digested and assimilated; that furnishes desirable ingredients to compensate for POORNESS OF PASTURE OR ANY MAJOR SOIL DEFICIENCY; that is invaluable as much in cases of malnutrition as in promoting the growth of young animals.

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the event of a shortage of some essential commodity, a system of rationing may be operated.

As a general principle we should aim at the least possible dislocation of normal farming practice. That is to say, areas carrying first-class pastures and efficienty used for intensive fattening or butterfat production should not suddenly be diverted to grain production.

THE BASIS OF OUR EFFORT SHOULD BE THE UTILISATION OF EVERY ACRE OF OUR HOLDINGS TO THE BEST ADVANTAGE.

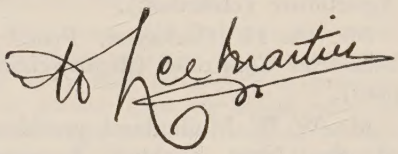
And that is the objective of the policy which the Council is formulating with the help of the advice of men experienced in the different branches of the farming industry and data supplied by officers of the Departments of Agriculture and Scientific and Industrial Research.

As the Minister charged with directing the production of farm commodities, I look with confidence to the members of this Council for advice and help, but our efforts will fail unless we obtain the response of individual farmers.

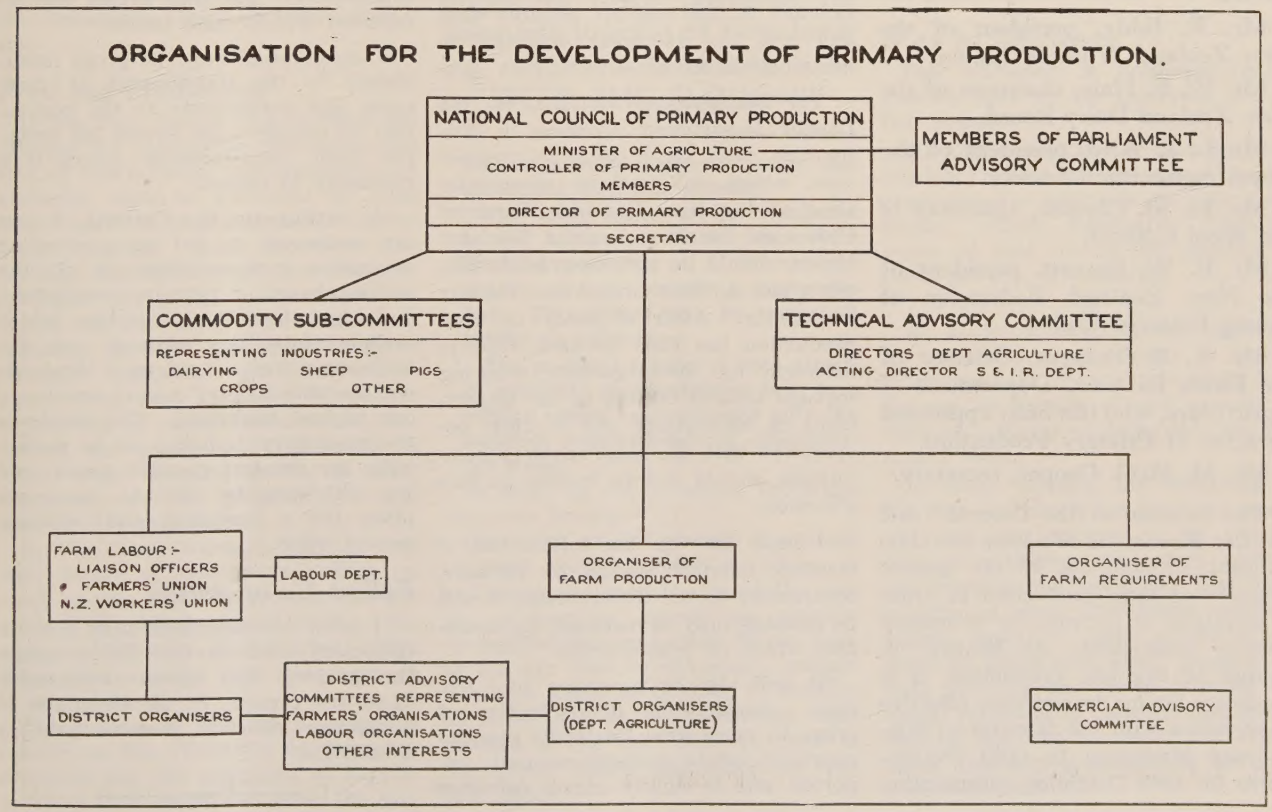
Local committees are being set up to cope with local problems. Once these committees are established we hope to have a network of organisation which will overcome any difficulties which may arise, and which will keep every individual farmer fully informed of the part he is to play.

In order that farmers may visualise the scope of the organisation which is being established, a plan of its ramifications is given below. This may be modified in detail from time to time, but I feel confident that whatever obstacles lie in their way, the Council and its subsidiary committees will show both initiative and resource in surmounting them.

THE SUCCESS OF OUR EFFORT—AND A SUCCESS IT MUST BE—RESTS ON THE RESPONSE THAT IS MADE ON EACH INDIVIDUAL FARM. LET US ALWAYS BEAR IN MIND THAT VICTORY GOES NOT NECESSARILY TO THE COUNTRY WITH THE BIG BATTALIONS, BUT TO THE COUNTRY WITH THE STAYING POWER AND THE POWER TO DEVELOP EVERY OUNCE OF ECONOMIC STRENGTH IT POSSESSES. MAY EVERY FARMER INSPIRE HIS EFFORTS WITH THE WILL TO WIN.



Minister of Agriculture.



National Council of Primary Production

Working Committee Representative of All Major Phases of Farming

THE personnel of the National Council of Primary Production, which the Minister of Agriculture, Hon. W. Lee Martin, has set up to advise the Government, through him, on farm production to meet the requirements of war, is as follows:—

Hon. W. Lee Martin, Minister of Agriculture (chairman).

Mr. A. H. Cockayne, Primary Industries Controller (deputy-chairman).

Mr. W. W. Mulholland, president of the New Zealand Farmers' Union.

Mr. R. Eddy, president of the New Zealand Workers' Union.

Mr. W. E. Hale, chairman of the New Zealand Dairy Board.

Mr. L. J. Wild, president of the Royal Agricultural Society.

Mr. H. M. Christie, chairman of the Wool Council.

Mr. E. W. Barnett, president of the New Zealand Federation of Young Farmers' Clubs.

Mr. R. B. Tennent, Director of the Fields Division, Department of Agriculture, who has been appointed Director of Primary Production.

Mr. M. McG. Cooper, secretary.

"The function of the Council," said Mr. Lee Martin, "is to advise the Government, through me, on the specific direction of farm production in order to maintain, to increase, or to modify primary production. As Minister in Charge of Primary Production, it is necessary for me to maintain effective co-operation with the Minister of Supply and Marketing to fulfil requirements for both Dominion consumption and export. I will be guided by the Council in making representations to the Ministers concerned. It will be necessary for the Council to maintain the closest touch with primary producers' organisations throughout the Dominion to ensure that any emergencies will be met with the least possible disruption of the normal course of farming and business.

Local Committees

"In order that the Council may work effectively it will be necessary to set up a detailed organisation of advisory and local committees, which should function at the earliest possible date and give the necessary elasticity to the whole scheme.

"The Employment Division of the Labour Department, working in conjunction with local advisory committees, which will include representatives of the New Zealand Farmers' Union and the New Zealand Workers' Union, should be able to provide adequate and suitable farm labour for any emergency. After a policy of crop production has been decided, capable direction by the organiser, working through district officers of the Department of Agriculture and in close co-operation with the local advisory committees, should ensure success in this direction.

"I hope that by the fullest use of tractors, whether owned by farmers, contractors or the Government, it will be possible fully to maintain the necessary areas in arable crops.

"It will also be necessary to introduce considerable diversification of crops to meet New Zealand's requirements of certain products normally imported, and to supply urgent demands which may arise in the United Kingdom. This involves detailed study of the potential demand for particular commodities, and also the investigation of production costs and the establishment of equitable prices.

Control of Farm Supplies

"In the control or possibly rationing of farm supplies, it is important to prevent a monopoly or local scarcity of any commodity causing an unduly sharp rise in price, as it now appears probable that for the duration of the war the major farm products will be marketed under Imperial Government commandeer, and that prices will be adjusted within rigid limits.

"Consideration must be given immediately to the stabilisation of farm costs, and particularly to the prevention of unduly high prices for essential farm requirements which it is necessary to import.

"In setting up the Council, it was my endeavour to set up a working committee representative of all the major phases of primary production, and when the full organisation, which includes subsidiary national and district committees, is set up I think we will be able to play a part worthy of our highest traditions. The whole of the machinery is being set in motion with the greatest possible speed, and we will soon be able to announce plans for a sustained and unprecedented effort.

Fullest Co-operation

"I wish to emphasise that the all-important consideration is to secure the goodwill and fullest co-operation of all the farmers of the Dominion in a supreme effort to increase primary production."

Speed the Plough!

Adequate Feed for Stock Means Increased Production

R. B. TENNENT, Director of Primary Production.

THE problem which faces all farmers is the best practical means of achieving an immediate increase in production. In livestock farming the quickest way of bringing about greater production would appear to be the provision of more feed.

Over a long period of years the value of breeding to increase the output of stock has been frequently pointed out, and farmers have not been slow to take advantages in raising the most productive types. However, although the importance of feeding has also been constantly reiterated, it has not received the attention it warrants. Improved feeding has such great potentialities that it deserves a key role in the immediate policy of farm production.

Feed and Production

It has been stated that without improving the quality or increasing the size of dairy herds, the production of butterfat could be increased by from 25 per cent. to 50 per cent. merely by better feeding. Such assertions are perhaps optimistic, but the evidence provided in "good" years when the supply of nutritious feed has been naturally plentiful in particular regions strongly supports this contention. There have been instances where the production of herds under these conditions has increased by as much as 50 per cent. In other words, the high-producing cow has been able to produce to her maximum.

In the sheep industry farmers are well aware of detrimental effect on wool growth resulting from a scarcity of feed at critical periods of the year and the difficulty of fattening lambs when feed supplies have not come up to expectations.

The success of pig raising depends mainly on the utilisation of dairy by-products and the provision of supplementary farm crops, and when the supplies of either of these feeds fall away the farmer is unable to finish off his pigs properly.

Waste and Scarcity

The major weakness in our feeding practice arises largely from the fact that the feed supply is characterised by alternate periods of waste-ful and harmful super-abundance and acute and injurious scarcity.

The basic cause of the weakness is the failure to realise that New Zealand pastures as a direct sole source of feed possess a grave defect. This defect may be expressed briefly as follows:—

The seasonal supply of feed directly available from pastures fails to a serious extent to correspond with the seasonal requirements of efficiently-fed stock.

In dairying for example, investigators have shown:—

(1) In the case of pasture of average to good quality under a system of utilisation designed to spread the supply of feed as evenly as possible throughout the year, from 68 per cent. to 77.5 per cent. of the year's production took place in October to January inclusive, and in the remaining eight months of the year 22.5 per cent. of the whole year's production of feed took place.

The call has gone forth for increased production. Our lands are fertile, our farmers are capable, and the need is all-important. Our immediate slogan to make provision for adequate supplies of farm feeding requirements should be—"SPEED THE PLOUGH!"

(2) An efficiently-fed herd of reasonably good production required 39.5 per cent. of the whole year's feed supply in the period October to January inclusive, and 60.5 per cent. in the remaining eight months.

In short, the seasonal supply of feed directly available from pastures is, in its distribution through the year, broadly the reverse of the seasonal requirements of feed.

The more this fundamental weakness of pastures used as a direct source of dairy feed is ignored in practice, the greater does the actual yield of dairy herds on farms stocked to their full capacity diverge from the potential yield of such herds.

Way to Efficiency

Full efficiency in herd-averages is possible only by the following one of two courses:—

(1) Under-stocking so that the feed available during periods of low pasture production is adequate for the herd needs. (This necessarily involves waste of feed during the periods of rapid growth of pastures.)

Or

(2) Suitably levelling the feed supply available from month to month throughout the year by providing feed for use in periods of low growth of pastures. Means of doing this are discussed later.

In sheep farming the weakness in the feed position is not only less acute, but also less obvious in its results. It is nevertheless often very serious, and investigation has shown that there is often a close correlation between faulty nutrition and unsatisfactory crops of lambs and wool. Further, in both dairying and sheep farming the casual relationship between inadequate feeding and the incidence of serious stock disorders is known to be close and considerable.

Two main ways of remedying or improving the position are strongly recommended:—

(1) An extension in ensilage and haymaking.

(2) The growing of special crops, such as mangolds, swedes, turnips, sugar beet, chou moellier, barley, maize and peas.

These two ways of improving the feed position are not to be looked upon as alternatives. Far from this being so, it often happens that if both are carried out in the one period on the one farm the position is more advantageous than if one alone is employed for the provision of special feed.

Hay and Ensilage

The great and valuable scope for expansion in ensilage and haymaking on dairy farms may be gauged from the following facts:—Research has indicated in a typical dairying district that while 52 per cent. of the whole year's production of pastures takes place in the period October to December inclusive, only 30 per cent. of the feed requirements of a well-fed dairy herd fall in the same period. From this it may be deducted that more than 40 per cent. of the grass production of this period is surplus and is available for haymaking and ensilage.

About 5,000,000 acres are devoted to dairying in New Zealand. The conservation of surplus grass growth on 40 per cent. of this area would give an area of 2,000,000 acres of haymaking and ensilage for dairying alone. Actually, the Dominion acreage for both dairy and other farm stock was 482,000 acres in 1937-38.

The position in respect to hay and ensilage may be summed up thus:—

In districts of good rainfall ensilage should be made on the majority of dairy farms devoted dominantly to pasture, and on many of those on which it is being practised already it could be extended advantageously. It could also be introduced advantageously into the work of a much greater number of sheep farms than now practise it. In the drier districts haymaking may suitably replace ensilage, and in districts of good rainfall haymaking and ensilage may both be carried out with advantage on many farms.

Growing Special Crops

The growing of special crops such as those listed above should have an important place on many farms. Apart from levelling out the supply of feed from season to season, properly-planned special cropping provides a useful opportunity for replacing inferior pastures, which are far too common on both dairy and sheep farms.

Further, special cropping is necessary for the most effective and profitable development of pig keeping, and the need for special crops is intensified with the change-over from the production of porkers to baconers. Frequently, an extension of the area sown in such crops as mangolds, chou moellier, swedes, carrots and lucerne for the feeding of dairy sows would also help the pig feed position greatly. The growing of additional crops for pigs, such as barley, peas and maize (for cobs), is often well justified.

The ultimate success of much sheep farming, as of dairying, is founded upon the milk supply, and, this being so, the feed requirements in sheep-raising parallel in essential features those of dairying. Hence, in practice, there is often a close association between special arable cropping and uniform success in sheep-raising.

Still Time to Sow

There is still time to sow this year, with good prospects of success, the crops listed. Chou moellier is important because of its high yield and its dependability and relatively low labour requirement. It calls for somewhat high fertility and good preparatory cultivation. Mangolds are excellent in yield and dependability provided they receive adequate culture and are given a fertile habitat. Recent trials in Taranaki have shown that sugar beet has a distinct value as a winter feed for pigs. Its requirements are similar to those of mangolds. Carrots, particularly the Guerande variety, rightly find strong advocates for use on free, fertile soils. Maize has been fed very successfully as cobs to pigs. The other crops mentioned are so well known as to call for no comment.

In order to secure the fullest effects from the policy of the National Council of Primary Production, the following have been appointed to act in executive capacities under the Director of Primary Production:—

Messrs. R. Eddy, president of the New Zealand Workers' Union, and A. P. O'Shea, secretary of the New Zealand Farmers' Union, have been appointed to organise farm labour in the capacity of liaison officers co-operating with the Labour Department and the district committees which are being formed throughout the Dominion.

Mr. R. P. Connell, Land Utilisation Officer of the Department of Agriculture, will act as Organiser of Farm Production.

Mr. G. A. Holmes, Crop Utilisation Officer of the Department of Agriculture, will act as Organiser of Farm Requirements.

In addition, Messrs. R. McGillivray, Fields Superintendent, Christchurch, J. M. Smith, Fields Superintendent, Hamilton, J. W. Woodcock, Fields Superintendent, Dunedin, and C. J. Hamblyn, Fields Superintendent, Palmerston North, will act as District Organisers of Farm Production, and will co-operate with the committees in their respective districts. The Instructors in Agriculture located throughout the Dominion will act as Local Organisers of Farm Production, again linking up closely with the district and local committees.

The call has gone forth for increased production. Our lands are fertile, our farmers are capable, and the need is all-important. Our immediate slogan to make provision for adequate supplies of farm feeding requirements should be—

"SPEED THE PLOUGH."

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SYKES'S DRENCH

Importance of Cultivation

Soil Tillage Is Vital If Maximum Economic Yield Is To Be Derived From The Land

C. R. TAYLOR, Fields Instructor, Whakatane.

"THE GROUND THAT I MANURED OR DUG FOR THEM WAS NOT GREAT."

THIS is a quotation from Defoe's famous book, "Robinson Crusoe," written in 1719, and it clearly indicates that the original meaning of manure was to till the soil by hand. The people of Defoe's day knew nothing of artificial manures as we know them and the wonderful assistance they can be as crop producers; all they knew was that thorough soil tillage was the only means available to them of securing the harvest that was so essential to their existence. Accordingly every effort was made by way of cultivation to ensure that the soil yielded its utmost bounty.

Whether or not the processes which accompany soil tillage were understood by the rural folk of two hundred years ago is really immaterial. The fact remains that they fully recognised the importance of thoroughly preparing the soil in readiness to take the crops that meant so much to them. If soil tillage or manuring was such a vital necessity to these people, is it not equally so with us today? Definitely it is, and for the following reasons.

> For hundreds of years thorough soil tillage has remained (and still is) of fundamental importance in arable farming. Not even artificial fertilisers can fulfil all of the functions of the simple act of soil cultivation, and it is left to the farmer himself to exploit Nature's bounteous provisions in the earth.

Four Reasons

In the first place, proper cultivation is very necessary for good germination, especially of the smaller kinds of seed. The soil must be worked to a fine tilth before a good seed bed can be prepared, and if this is not done a reduction in crop yield will assuredly result. Secondly, cultivation not only facilitates drainage in the top six to nine inches of soil where this is required, thus tending to render it warmer and sweeter, but it also conserves soil moisture when this is necessary.

Thirdly, soil tillage allows free access to the oxygen of the atmosphere. This is most important, as, without oxygen, certain bacteria in the soil which break down organic compounds containing nitrogen (that is, decaying matter) into a form that plants can assimilate could not possibly live. In such an event nitrogen starvation would result, and the effect of this condition is best illustrated by reference to a pasture growing in a rather water-logged soil. The leaves of grasses are a sickly yellowish green, while the clovers are most conspicuous by their absence. Moreover, oxygen is directly required by plants for proper root development, and in some soils it is also vitally necessary to counteract certain toxic substances that are harmful to plant life.

Fourthly, cultivation encourages the decomposition of mineral matter into plant foods, and finally, but not least, the land and growing crops are kept free from those vicious robbers—weeds.

Soil Tillage

It will be clear, I think, from what has been stated that soil tillage—and by that I mean thorough cultivation and not mere surface scratching as is so frequently practised nowadays—is really of fundamental importance if the maximum economic yield is to be derived from the vast resources of the earth's surface. Anything short of adequate cultivation must of sheer necessity reduce crop yields, for there is

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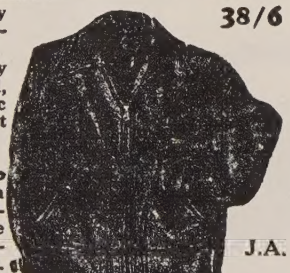

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absolutely nothing—not even artificial fertilisers—that can fulfil all of the functions of the simple act of soil cultivation.

Probably the two main reasons why cultivation is not now given the same degree of attention that it was at one time are:—(1) Artificial manures are now manufactured to supply the principal plant foods which at one time could only be wrested from the soil by intensive tillage, and therefore from this particular angle the need no longer **appears** to exist for real concentration of this work, and (2) the comparative simplicity of the act of cultivation tends to detract from its importance.

As a Supplement

Now, regarding the reason (1), it cannot be too emphatically stated that artificial fertilisers were introduced solely for the purpose of **supplementing** the soil's reserves of available plant food following thorough cultivation, and **not to obviate the necessity for proper soil management** as many people seem to think.

The tendency today, however, is to attempt to make fertilisers do much of the work that cultivation does, but, as already shown, this is quite impossible, for fertilisers cannot pulverise the soil and bring it to a fine tilth; nor will they contribute anything towards the drainage, moisture conservation, and aeration of a piece of land. Only cultivation can perform these vital functions, and the sooner this is realised the sooner will those whose job is the exploitation of the "good earth" be fully rewarded. As matters stand at the moment, far too many farmers are being only partially repaid for their labour and invested capital because the weak link in their chain of farm management is lack of appreciation of the supreme value of soil tillage.

Simple Things First

Coming to reason (2), this is probably due, I think, to a characteristic trait in human mentality that tends to prevent us from viewing things in their true perspective. Because an operation is comparatively simple it not infrequently happens that its virtue is considerably discounted in favour of something much more complicated. Complication complexes have in the human mind a wonderfully fertile medium in which to flourish and unduly develop, with the result that, unless always on guard against such happenings, most of us are prone to look for the most difficult solution to our problems instead of first investigating the simple and usually most obvious possibilities.

An illustration of this peculiarity is to be found in the actions of the motorist whose car has suddenly stopped on the road. He gets out in a great hurry, lifts the bonnet, tinkers with the carburettor, pulls it to pieces, and reassembles it again, gets back into the car, and attempts to start it up. Nothing happens, however, so he begins to think instead of hastily acting. It then occurs to him that probably nothing serious is wrong after all, and that the trouble may be only a simple matter of no benzine—which it is. Because lack of benzine represented an easy solution to a situation that could have been more serious it did not enter the motorist's mind until a more complicated task had first been thought of, tried out, and found wanting.

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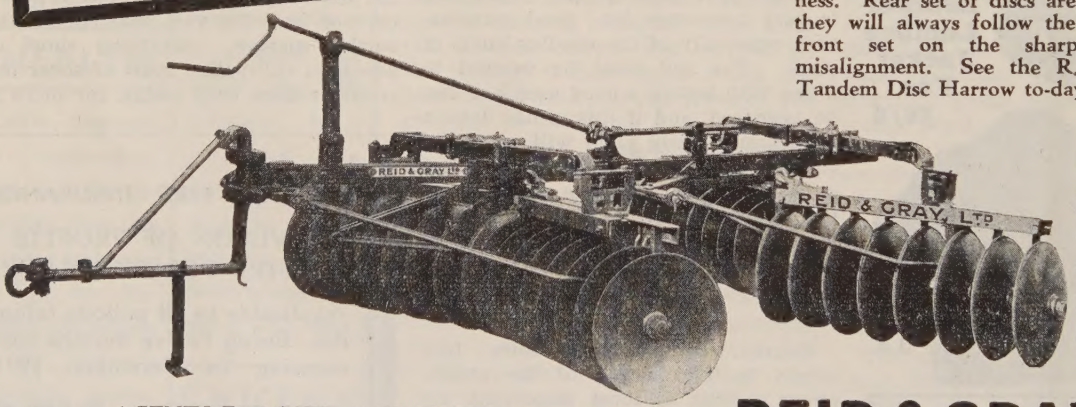

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Left (Fig. 1).—A teamster preparing the land for a second crop of maize. The furrows are between 4in. and 5in. deep, and are being evenly turned over. This greatly reduces the work of final cultivation, and ensures a really good seed bed, without which only mediocre results are possible. *Right (Fig. 2).*—Inter-row cultivation in a maize crop which yielded heavily in spite of the prolonged period of dry weather experienced last season. The grower is an enthusiastic advocate of cultivation whether it is for maize, root crops or any other purpose.

Exploiting Nature

And so it is with the cultivation of the soil. Simple? Yes, very. And yet what tremendous issues depend upon the thoroughness with which it is accomplished! No farmer who values his intelligence and the job of work to which he has set his hand can possibly afford to ignore this vital question, for upon it hinges not only his own prosperity but that of his fellow-countrymen as well.

Nature has provided in the earth's surface and the atmosphere that envelopes it an ample measure of life-sustaining elements, and she has left it to us—her highest animal form—to exploit her bounteous provision to the best advantage of all creatures. Since, however, the elements of life have been locked up in the earth's crust in a manner calculated to prevent excessive wastage and, incidentally, also to furnish us with work, it becomes necessary to know just how these elements can be unlocked and made use of.

The answer, of course, is soil cultivation of the good old-fashioned kind, and the reasons have been explained in the second paragraph of this article.

Maize Crops

Now for a few thoughts on the cultivation of maize crops. In good land, and where the climate suits, maize may be grown successfully in the one place for many years in succession provided due consideration is given to the important question of cultivation both prior to the sowing of the crop and as long afterwards as growth will permit. On less fertile soil types maize can also be grown as a payable proposition when cultivation is really thorough and the climate is acceptable to the crop.

As maize is a comparatively shallow-rooting plant, possessing an enormous leaf surface from which transpiration is very great, it will be clear that if the plant is to develop normally it must never be allowed to become short of moisture. Moreover, it also demands a relatively high soil temperature before satisfactory growth can be made.

Here, then, are two conflicting factors to be reckoned with—adequate soil moisture and soil temperature—and the question is how can the two be reconciled? Well, there is only

Left (Fig. 3).—A close-up of the cultivations shown in Fig. 2. The crop was planted in October, and intensive cultivation preceded sowing operations. The soil is a light pumice loam. *Right (Fig. 4).*—A young maize crop which has just been thoroughly cultivated. Although a really excellent maize-growing soil, it is also very weedy. Note the absence of weeds through control by efficient cultivation.

one possible answer to this problem, and that is: Adequate soil preparation by way of cultivation, for this, for reasons already given, is capable of maintaining simultaneously both temperature and moisture.

In this connection it can be confidently stated that, provided all other things are equal, the yield from a maize crop will be directly proportional to the degree of soil preparation given the land before sowing and the amount of inter-row cultivation after the plants are up. This being so, it will be abundantly clear that success in maize-growing depends to a very large extent upon the attention given to cultivation.

Planting

Maize planting usually takes place between mid-October and early November in those districts that are free from frost at this period. Therefore, to get the soil into the necessary condition for this operation early ploughing is essential. Where practicable, skim ploughing in the winter is desirable, followed by a later ploughing in September, but when this is not possible a furrow of at least four inches should be well turned over in August and immediately rolled. This ensures a rapid decomposition of vegetation, and very greatly assists subsequent working down to a good tilth. Rough ploughing should be avoided at all costs, as not only does it materially add to the task of seed bed preparation, but it also facilitates the growth of the weeds which, under these conditions, invariably spring up between the furrow slices and elsewhere.

A few weeks after ploughing and rolling the work of discing and harrowing should be undertaken. This work is also of the utmost importance and requires to be accomplished in just as thorough a manner as ploughing; otherwise a serious reduction in yield can definitely be expected. Good tilth, soil aeration, drainage, and moisture-holding capacity all result from cultivation that **follows** ploughing, and hence there should be no slackening of efforts in this direction.

Unfortunately, this phase of the work of soil tillage is very frequently done in a hasty and rather haphazard manner, and as a consequence the grower is only partially repaid for his labour and incidental expenses. This is regrettable, and surely can only be the outcome of an imperfect knowledge of the principles governing the age-old practice of cultivation, for, were it otherwise, it would be necessary to believe that growers of maize and farmers generally were deliberately organising their activities with the object of defrauding themselves, which, of course, is incredible.

Cultivation

After the young plants are up a few inches inter-row cultivation should be carried out. This operation is necessary both to control weed growth, which is very bad in certain districts, and to break up the caked soil surface to permit the free access of atmospheric oxygen. Moreover, it also acts as a mulch in preventing excessive evaporation, and allows excess moisture to find its way to the lower strata, from whence it can be withdrawn when necessary by capillary attraction.

While the plants are small cultivation should come fairly close up to them and be reasonably deep. Later, as the plants develop and their roots begin to spread out in search of food, it will become necessary to cultivate less deeply and progressively away from the plants. This type of cultivation can, and should be, continued with at regular intervals until it is no longer possible to take the implement used between the rows without seriously damaging the maize. Once this stage has been reached no further cultivation can be given, and the crop that results will very largely reflect the grower's appreciation of the value of proper soil tillage.

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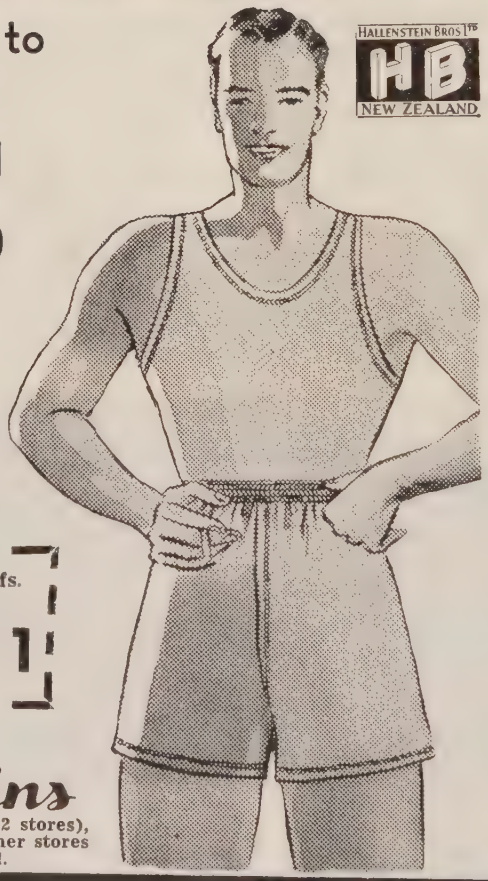

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Handling The Wool Clip

Main Factors In Preparation Of Wool Shed and Yards At Shearing Time

J. E. DUNCAN, Wool Instructor, Wellington.

PREPARATION of the woolshed and yards for handling the wool clip at shearing time should not be left to the last minute, when time is precious. The main factors are a little common sense and forethought, and such things as broken rails, gates which will not work, and protruding nails and splinters should be given the necessary attention.

In the wool shed all necessary supplies should be on hand, and any defects, such as leaks in the roof, broken gates and windows, splintered floor battens, etc., should be made good well beforehand. Cleanliness in the shed, and particularly in the wool room, is very necessary, and all accumulations of rubbish, old sacks and skins, chaff and other matter in and about the shed should be removed so that there is no possibility of these things infecting sheep with shear cuts or contaminating the wool.

The shearing board and wool room should be scrubbed out with soap and water, followed by a good swabbing with strong disinfectant, and in cases where the shed is inclined to be dingy a great improvement can be effected by whitewashing or white painting the inside of the wool room or even the whole shed. Good light is essential for good wool classing, and clean windows also help considerably.

Preparation of Sheep

Dust in the wool is undesirable for several reasons. It reduces the yield, and, with it, the value of the wool, and makes it harsh-handling and perhaps permanently stained, besides resulting in harder shearing and more grinding of combs and cutters. Drive sheep over grass paddocks in preference to roads on the way to the shed, and keep them out of dusty yards if possible.

The main factors in preparing the woolshed and yards and in handling and preparing the wool clip at shearing time are discussed in this article. Although much of the article will not be new to the experienced man, others who are not so fortunate will find many profitable "tips."

It is hardly necessary to add that sheep should be properly dagged before shedding them, and if it is possible to keep them in a bare holding paddock for a few hours before they enter the shed it will greatly reduce the fouling of the floor battens and the risk of getting the wool accidentally stained.

Shear-cuts and Second-cuts

Today we have far more complaints than formerly from the buyers about pieces of skin in the wool giving trouble during manufacture. This seems to point to less care being taken in shearing, but it is also undesirable from another aspect in that it increases the risk of infection with such troubles as tetanus (lock-jaw), malignant oedema (blood poisoning), and caseous lymphadenitis (cheesy gland).

In dressing shear cuts avoid tar, particularly coal-tar, which is damaging to the wool. **Genuine** Stockholm tar is not so bad from the wool point of view, but it is preferable to choose one of the reliable proprietary disinfectants which leave no stain on the fleece.

The reason why second-cuts are so disliked by the buyer and manufacturer is that they increase the amount of noil (short wasty fibres) during combing, and at the same time reduce in length what is often the best wool in the fleece.

Picking Up the Fleece

The "fleece-o" or fleece-picker's job is more responsible than appears at first sight, for apart from keeping the board swept and attending to belly-wool, etc., he must be adept at throwing the fleeces on the wool table so that they lie flat and evenly; otherwise the skirter cannot devote his full time and attention to his job. Further, only **one fleece must be thrown on the table at a time;** otherwise the short and fribby bits from the bottom fleece alone fall through the slats in the table, and the short bits from any fleeces on top of it remain in the wool.

Good dimensions for a wool table are 9ft. x 4ft. x 3ft. high, and it should be possible to get right round it.

Skirting

The object of skirting is to remove all the wool below the average quality of the fleece, leaving the remainder as uniform as possible. It necessitates the removal of all dingy, stained, seedy and heavy-conditioned wool and greasy fribby bits from round the legs and brisket, tender wool, light wasty and knotted wool round the neck regions, and coarse britch wool. It may also involve removing tender and earthy wool from the back.

Proper skirting calls for considerable judgment, and each fleece must be treated on its merits and a compromise struck between over- and under-doing the job.

Skirting should, if possible, be done at the time of shearing as soon as the fleece is thrown on the table. Once the fleece has been rolled skirting

cannot be done so easily or efficiently as before, so that whatever else is to be done to the wool—whether it is to be binned, store-classed or interlotted—an attempt should be made to skirt it properly at shearing time.

Rolling

The correct method of rolling depends on the subsequent treatment the wool is to receive. If it is to be unrolled again in the store fold the fleece in three lengthwise and roll from both ends. This is easy to undo. Above all, avoid the "shoulder roll" (draping the shoulder wool around and over the rest of the fleece), for this is very difficult to undo in the store and the fleece is torn about in the process, spoiling its subsequent appearance.

It is a business axiom to display your goods for sale in the most attractive manner. Therefore it is not dishonest for the grower to roll his fleeces in such a way that the best wool is showing. In general, the shoulder wool is the best and the back and britch wool the poorest. Thus, if your wool requires no unrolling in the store before sale, fold in the fleece lengthways one-third of the way, and then continue to fold this doubled portion over **in the same direction** on top of the remaining third. This gives the back wool lying as a strip along the top of the folded fleece. Now roll from one end, britch to shoulder, and you will display your wool to best advantage.

Don't waste time making fancy rolls. If you have time to spare it is best devoted to more care in skirting.

Classing

It is not proposed to deal here with all the various methods, such as Sorting or Scouring, open to the farmer for the disposal of his wool, but only to mention the more usual procedures of classing (on the farm or in store) and Binning. Offering for sale without classing certainly cannot be recommended, for although one still hears assertions that wool-classing does not pay, there is now ample proof to the contrary.

A large-scale experiment recently carried out in South Africa by the Wool Marketing Committee showed that only in extremely isolated instances and in exceptional circumstances did unclassed clips fetch as much or more than classed clips, and in the great majority of cases the extra return due to classing was well over 1d per lb. Although no trial on this scale has been carried out in New Zealand, how else, except by similar conclusions, can we reconcile the fact that speculators can make a living year after year by buying unclassed clips, classing them, and then re-selling.

Further, it should be borne in mind that wool's synthetic competitors are offered for sale as standardised products, which require no classing. Proper preparation of our wool is essential if we are to compete with these substitute fibres.

Aim in Classing

The aim in classing is to divide the clip into the minimum number of lines with the maximum difference between each. Overclassing is definitely to be avoided, as it will result in the making of a number of "star-lots" (lines of less than 4 bales), which must be avoided wherever possible, as they

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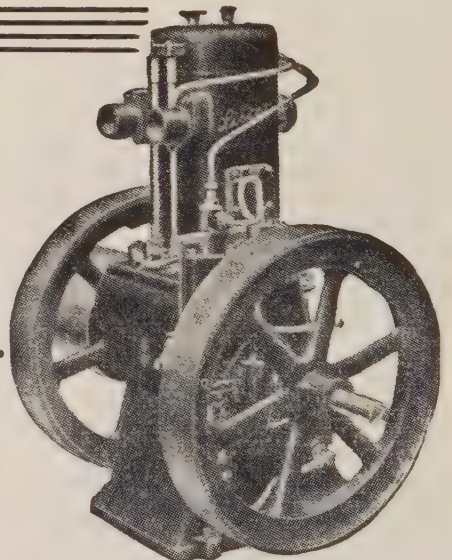

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cannot be sold in the main catalogue. Where a clip is so small that proper classing on the farm is impracticable, the system of binning (or pooling), as carried out by any reputable wool-broker, offers the best solution. Under this system the smallest quantities of wool (even a single fleece) are correctly graded and sold to the best advantage as part of large, well-graded lines.

In medium-sized clips it is often possible to class the bulk of the clip on the property and send in the oddments for binning. This is better practice than having them interlotted by the broker. Interlotting is merely a makeshift grouping of similar bales to avoid the selling of "star lots." It seldom pays, except in the case of very large clips, to attempt to make "super" lines. It is better to leave this good wool in the top line to enhance the value of the latter, and also to avoid the practice of "forcing," that is, putting a fleece into a higher line than that to which it belongs. When in doubt, grade down.

Adequate facilities are necessary to carry out good classing, and first and foremost among these are good light, plenty of space, and an adequate number of bins in the wool room.

Examples

The following are examples of the lines to be made in some typical New Zealand wool clips, but it must be emphasised that no really hard and fast rules can be laid down, as every clip must be treated on its merits. In Merino wool length is of relatively greater importance than in the case of crossbred wool, where length is usually adequate and count is of primary importance.

MERINO CLIP.

AA. Comb. (Fine Merino).—64/70's count. Consisting of all the longest, soundest and brightest wool, not too heavy in condition.

A. Comb. (Medium Merino).—60/64's count. Ditto. Ditto.

B. Comb. (Strong Merino).—58/60's count. Ditto. Ditto.

M. Clo.—58/70's count, consisting of all the wool similar in description to the above lines, but lacking in length.

M.—58/70's count, consisting of all the heavy conditioned and fatty fleeces in the clip regardless of length.

HALF-BRED CLIP.

AA.½B. (Fine Half-bred). — 56/58's count. Good length and all the soundest, brightest and lightest wool of these qualities.

A.½B. (Medium Half-bred).—54/56's count. Ditto. Ditto.

B.½B. (Strong Half-bred).—50/54's count. Good length, and all the soundest, brightest and lightest wool of these qualities.

½B.—50/58's count. All fleeces lacking in length and heavy in condition.

CROSS-BRED CLIP.

AA. XB. (Fine Crossbred).—46/48's count. Sound, good length and colour, even condition.

A. XB. (Medium XB). — 44/46's count. Preparing length, sound, good colour.

B. XB. (Medium XB). — 44/46's count. Shorter staples fleeces, carding length, sound, good colour.

C. XB (Strong XB).—40/44's count. Sound, good colour, even condition, all lengths.

CC. XB. (Low XB.).—36/40's count. Sound, good colour, even condition, all lengths.

The above grading applies to medium-sized clips. In the case of larger clips some of these lines can be further subdivided as may be necessary. Keep all hogget wool separate from the rest of the clip, and keep cotted fleeces separate. In the case of tender or seedy fleeces, if there are only a few keep them separate, but if the whole clip is affected disregard and class as if these faults were not present.

In clips where the proportion of inferior wools, such as stained and dingy, are not high the best way of disposing of this wool is to have it binned, but where the inferior grades form a considerable proportion they can be made into one or more cast lines. The same principles of treatment and disposal apply to the oddments, such as necks, pieces, bellies, locks, etc.

Pressing

Before putting the pack in the press shake out any loose fibres and bits of twine. If necessary, turn it inside out to do this. Most farmers know that packs are easier to sew after they have been warmed in the sun for a while. Fit the fleeces into the press in regular layers of four (one in each corner) with a fifth in the centre in the case of small fleeces. This gives a well-packed and shapely bale. Where your bales have to be reopened in the store for classing, binning, etc., the use of the lockstitch is not essential.

At all times avoid pressing damp wool, which will certainly become discoloured, and may even catch fire by spontaneous combustion in bad cases. Don't overpress heavy-conditioned wool. On the other hand, there must be a minimum of 1½ cwt. of wool in the pack before it can be considered a bale.

Deliberate false packing is fortunately rare today, but "irregular" packing is still too common. A few inferior fleeces in the middle of a bale are the surest way for a grower to damage his good reputation with the buyer, who cannot be blamed for passing on this information to his colleagues.

Branding the Bale

A neatly-branded bale is just as easy to turn out as a slovenly-marked bale, and it immediately creates an impression of care and efficiency. Use clear-cut block capitals at least three inches high applied with a stencil and proper black stencil ink. Do not use any oily or fatty substances, because the grease in the wool will quickly cause these to spread and become illegible. Do not use any colour other than black, nor any numerals other than those denoting the sequence of the bales. This sequence should run without interruption from the first to the last bale.

INCORRECT DIAGRAM FOR STENCILS

NUMERALS MOST LIKELY TO CAUSE CONFUSION

REJECT THESE

1 5 4 5 8

CORRECT DIAGRAM FOR STENCILS

NUMERALS LEAST LIKELY TO CAUSE CONFUSION

USE THESE

1 2 3 4 5

6 7 8 9 0

[Diagram reproduced from bulletin of Western Australia Department of Agriculture, "Branding the Wool Bale," by G. L. Sutton and N. Davenport.]

Avoid conjoined or complicated signs which cannot be transcribed on the typewriter, and use recognised abbreviations such as those shown in the list below. The station brand must consist of at least three letters. A bale of wool branded E AAA XB will fetch no higher price than if it had

simply been branded EA. It is not even essential to brand the class of wool on the bale at all, as full particulars should be kept in the wool book provided for the purpose.

Some numerals are more prone to lead to confusion than others, particularly if smudged or mutilated. Use those recommended in the diagram.

N.B.—Under the new Commandeer Regulations it will be necessary for farmers to brand their bales on **one end and one side only,** leaving the other end and side free for countermarks in the store.

Abbreviations

In addition to the grade, such as AA or A, either of the letters E or W can be added to denote ewes or wethers. H is added in the case of hogget wool, and LBS for lambs.

The following abbreviations are also in common use:—

COT = Cotts.	D = Dingy.
BLS = Bellies.	S = Stained.
PCS = Pieces.	T = Tender.
LKS = Locks.	SDY = Seedy.
CTG = Crutchings.	

Wool Marking

Complaints from the buyers about trouble with deleterious branding fluids have been on the increase lately, and they have threatened to boycott all wool marked with such substances. A considerable number of these complaints have been traced to their source, and it has been found that a number were due to the use of home-made branding fluids, others to the improper use of commercial types, and a few appeared to be due directly to certain of the proprietary fluids. It need not be added that such things as tar, pitch, and paint are very injurious. Farmers should be careful, therefore, to use only well-known proprietary fluids which they know will not damage the wool, and in using these the directions must be carefully followed.

In particular, make sure that the fluid is thoroughly stirred and not applied as a thick, sticky deposit to the wool. Should it require thinning as the result of evaporation, use petrol (ordinary clear motor spirit) and **on no account** such substances as linseed oil or turpentine.

The same care is necessary in the selection and use of raddles and marking sticks or crayons. Select only reliable makes which will do the least damage to the wool, use them sparingly, and, where possible, confine the markings to the head, where the wool is of inferior value in any case.

Foot-rot in sheep continues to give a good deal of trouble to sheep-farmers, particularly in Canterbury and Southland. Wet seasons are blamed for the greater number of sheep affected. It has, however, been found that thoroughness in the eradication of the disease during a spell of dry weather is not sufficiently exercised, that chronic carriers are left in the flock, and that the disease then spreads rapidly in wet weather. An amendment to the Stock Act has been passed which it is hoped will have the effect of preventing the exposure and sale of badly infected sheep, and thus afford a measure of protection against the spread of the disease.—*Annual report of the Director, Livestock Division.*

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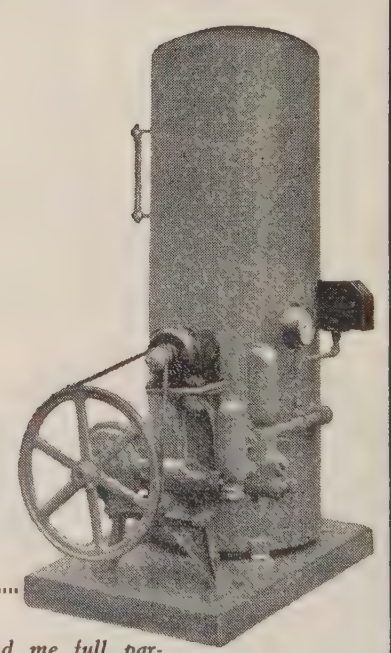

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An Innovation in Grafting

G. H. McINDOE, Orchard Instructor, Hastings.

THE accompanying photographs depict a distinct innovation in reworking apple trees as practised by Mr. T. Mitchell, of Twyford, and the results obtained emphasise the liberties that can be taken where soil and climatic conditions permit.

The trees were headed to about 8 ft. high, and grafts up to approximately four feet in length were inserted by the wedge method—that is, after limbs were cut to the desired length, the ends were split, and the grafts, having been cut at the base to a wedge shape, were inserted in the splits.

Suitable sub-leaders and laterals were similarly treated with grafts of varying lengths, but all greatly in excess of the orthodox graft length. Trees grafted during the last two seasons show a practically 100 per cent. "take," and the resultant growth and development has been remarkable.

Tight Grip

It would be expected that grafts of such length would have insufficient strength in the union to support even their own weight or to withstand the very heavy winds experienced this summer, but the absence of breaks is, no doubt, due mainly to the tight grip exerted by the contraction of the split.

The only objectionable feature is the extent of the injury caused by the split, which could provide access for wood-rotting organisms, but this is partly overcome by inserting another short graft in the opposite end of the split by coating the injured surface with grafting wax to exclude the air and foreign moisture.

It should be noted that the trees worked over were in a healthy, vigorous condition, and that the orchard was maintained in a high state of cultivation—factors which, no doubt, aided materially in providing the requisite sap-flow to maintain the grafts and promote quick unions. This system has advantages not possible with short grafts in that the additional length of graft and the consequent greater leafage must act beneficially in restoring the balance between root and leaf surface, and that the immediate fruit spur formation shortens the period during which the trees would otherwise be unproductive.

Left: Photo taken the season following grafting, showing one limb cut back and grafted with a long graft. The point of union is marked with an arrow. *Middle:* Showing the second year development on the long graft. *Right:* Showing the subsequent growth of the tree, which was regrafted as described in the article.

Convenient Length

It is probable that grafts up to about 2 ft. 6in. long will be more satisfactory from the commercial orchardist's point of view than the 4 ft. lengths used. Partly as a measure to promote maximum development, all fruit is stripped from the grafts until the third year after grafting.

While the wedge graft has been used exclusively, it is conceivable that in the lighter wood the whip graft would be equally satisfactory, but the cleft or rind grafts would not be successful because of the restricted uniting surfaces.

The success of grafting under any system is governed to an appreciable degree by the skill of the operator, in that intimate contact between the graft and the scion is essential, and to acquire that intimate contact each cut must be made continuous on the one plane to avoid the ridges and varying planes that occur where several cuts are made in one surface. With the wedge graft, in particular, the maximum possible length of wedge commensurate with the length of the split should be made in order to provide the greatest possible length of uniting surfaces.

Orchard Management

REPORTS to hand indicate that the major orchard diseases and pests were kept satisfactorily under control, states the annual report of the Director of the Horticulture Division. The continued dry weather was favourable to the development of codling-moth, leaf-roller caterpillar, bronze beetle, and apple leaf-hopper, and necessitated extra precautions being taken on the part of the grower to keep these pests in check. Dicky-rice weevil has been causing some concern to citrus growers in the Avondale district, Auckland. A survey of the affected area has been made, and steps taken with the view of keeping this pest within bounds.

Growers generally are maintaining their orchards in reasonably good order. Equipment used both outside and in packing sheds is up to date, and very few growers now lack first-class equipment. The general trend in spraying equipment is to provide pumps of greater capacity and to improve the reticulation of orchard areas by using large-capacity pipes. The gradual change is tending towards greater efficiency in every direction and improved disease-control.

In general orchard - management growers are efficient and up to date, but could with advantage, as a general rule, devote more attention to a detailed thinning of the fruit crop. The lack of detailed thinning is evidenced in misshapen fruit, the greater range in sizes, and much of the undersized fruit which is harvested.

Grading of Export Butter and Cheese

Leading Dairy Factory Averages for Year 1938-39

Contributed by the DAIRY DIVISION.

BUTTER-MANUFACTURING companies which have obtained an average grade of 94 points or over and cheese-manufacturing companies which have obtained an average grade of 93 points or over are listed below.

Of the total 160 creameries or dual-plant factories manufacturing butter for export, 37 are included in the list, as compared with 29 for the previous year, and of the 276 cheese factories and dual-plant factories manufacturing cheese for export, 10, as compared with five for the previous year, have averaged 93 points or over.

Of the total factories listed, 29 butter and six cheese factories are situated in the North Island, and eight butter and four cheese factories in the South Island.

Company or Proprietor.	Reg. No.	Brand	Ton'ge graded	Ave. Grade
Butter.				
Murchison	1888	Airship	248	95.007
Taieri and Peninsula	54	Taieri & Peninsula	17	95.000
Rangitikei	1360	Rangitikei	165	94.995
Rangiwahia	750	Quail	93	94.993
Rodney	394	Rodney	560	94.888
Karamea	1570	Karamea	205	94.868
Taihape	1188	Tikapu	402	94.777
Kaikoura	302	Kai	269	94.733
United	1296	Whariti	282	94.701
Awahuri	664	Red Rose	754	94.684
Wairoa	1345	Wairoa	228	94.648
Rata	938	Rata	847	94.583
Collingwood	1245	Golden Hills	188	94.580
Levin	910	Lake	904	94.533
Maungaturoto	1407	Otamatea	1081	94.508
Konini	1203	Konini	561	94.495
Wangaehu	1326	Wangaehu	499	94.476
Golden Bay	146	Sovereign	572	94.453
Inter-Wanganui	6	Inter-Wanganui	111	94.224
Bay of Islands	1312	Bay of Islands	952	94.218
Mauriceville	14	Mauriceville	742	94.213
Rongotea	8	Rongotea	772	94.210
Kuku-Manakau	905	Ohau	363	94.191
Municipal Milk Dept. (Wellington)	202	Rahui	62	94.190

Company or Proprietor.	Reg. No.	Brand	Ton'ge graded	Ave. Grade
Masterton	1307	Masterton	555	94.182
Mangorei	345	Mangorei	991	94.180
Eketahuna	46	Eketahuna	152	94.166
Cheltenham	3	Pakeha	1526	94.155
Kairanga	1768	Longburn	501	94.152
Shannon	1489	Shannon	978	94.131
Norsewood	600	Norsewood	1029	94.115
Kia Ora	926	Kia Ora	772	94.087
Albertland	298	Port Albert	1241	94.081
Waitara	726	Waitara	486	94.058
Kaikohe	40	Kaikohe	279	94.057
Westland	145	Westland	362	94.036
Uruti	300	Uruti	201	94.010
Cheese.				
Omimi	74	Omimi	62	93.485
Westmere	1621	Westmere	317	93.412
Bruntwood	1534	Bruntwood	703	93.401
Stirling	1030	Stirling	290	93.332
Kai Iwi	1565	Kai Iwi	31	93.302
Kaimata	992	The Oaks	344	93.229
Milton	1030	Milton	75	93.172
Titiroa	361	Cloverpark	138	93.165
North Taranaki	723	Flax	107	93.047
Bell Block	488	Bell Block	362	93.025

Growing of Mangolds

— By —
J. E. BELL,
Instructor in Agriculture,
Auckland.

Ploughing land in winter in preparation for mangolds.

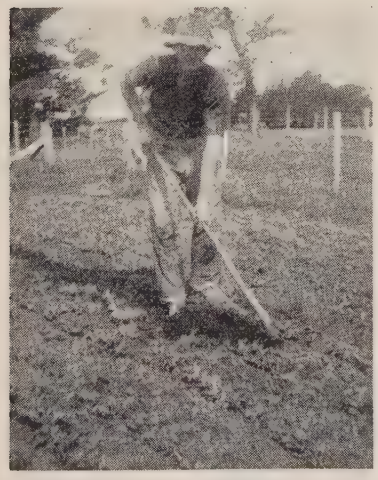
Discing the ground for a seed bed.

Drilling the mangold seed and fertiliser in the seed bed.

THE growing of mangolds as a fodder crop in New Zealand has declined to a very great extent, until to-day only about 8,000 acres are grown annually. With the improvement in our pastures through topdressing, there has been a decline in the growing of annual fodder crops. The decline has been comparatively greater in the dairying districts, where pastures have been improved to a very considerable degree.

Today, in Franklin County, very few mangold crops are encountered. A few years ago, in the Mauku district, almost every dairy farmer grew an acre or so of mangolds for feeding his dairy cows in the winter. Yields averaged about 40 tons per acre. Higher yields were, of course, obtained, and in crop competitions conducted there the highest and lowest yields during the last few years were as follows:—

	Highest Yield (Tons per acre)	Lowest Yield (Tons per acre)
1935	43	24
1936	58½	39
1937	60	19
1938	55	29
1939	51	32



Using a heavy hoe between the rows of seedlings.

Mangolds are recognised as productive of very large amounts of feeding value per acre. In fact, it is often claimed that the mangold is the premier crop in this respect. Further, mangolds keep very well, and are better in this respect than any other root crop. They are esteemed, therefore, for feeding during the late winter and early spring, when other crops are not available. They are fed with hay.

Mangolds contain very little protein, and, when fed to cows, maintain their condition, but are not productive of milk. The milk supply is secured from the grass consumed. If, however, cows on a ration of hay, mangolds, and a limited supply of grass are deprived of the roots, then the production of milk will fall, because the grass consumed is required for maintenance purposes.

Early Attention

The mangold seedling is slow in establishing, being at the mercy of the faster-growing weeds. Consequently, the crop requires much attention during the early half of its growing period. The mangold must be pulled a month or so before being fed to stock. During this period it is said to "ripen," and during this process the poisonous substances present in the fresh mangold are rendered innocuous. Thus, the growing of mangolds entails a large amount of hand work, making it a crop suited to the smaller and more intensive farms.

Weeds are faster in growth in warmer districts, and mangold-growing would be almost impossible in Franklin County were it not for the peculiar method of growing them adopted there.

Following the improvement in pastures through topdressing, there has been a considerable decline in the growing of mangolds as a fodder crop, although they are recognised as productive of large amounts of feeding value per acre. Methods employed in growing profitable crops of mangolds are described in this article.

The mangold seed is sown in specially-prepared beds about September in rows about 1ft apart. The seed is sown very lightly at about the rate of an ounce to the chain, using about 4lb of seed for every acre to be planted. As the real mangold seed is small, a firm, fine seed bed is essential. The so-called mangold seed which is sown is really the fruit of the plant, and contains normally three seeds.

It is essential to give the young plants a quick start; therefore, quick-acting fertilisers in large amounts are used for the seed bed. To prevent germination injury, all fertilisers prone to give this trouble, such as sulphate of ammonia and potassic compounds, should be sown broadcast before sowing the seed. Part of the superphosphate can then also be applied. The remainder of the fertiliser is applied with the seed in the rows either by hand or drilled in.

Fertilisers

If the soil is deficient only in phosphate, then 4cwt of superphosphate broadcast and 4cwt. in the drills should prove a suitable dressing. If potash is deficient, then a mixture of 2cwt. superphosphate and 2cwt. potash should be applied broadcast with 4cwt. superphosphate in the drills. The amount of superphosphate applied in the drills should be decreased on areas where the rainfall is low to avoid germination reduction. Germination injury can be reduced still further by mixing the superphosphate with an equal weight of lime two weeks before sowing in the drills. In some soils the amount of fertilisers can be decreased, or even omitted, but it is generally advisable to sow some superphosphate in the drills.

The mangold seed soon germinates, but so do the weeds. The weeds are destroyed by one or two hand hoeings between the rows, and, where necessary, by hand-weeding close to the mangold plants. The mangold plants, however grow so thickly together that control of the weeds growing among them is not difficult. In the meantime, the land where the mangolds are finally to grow is being ploughed for the second, and possibly for the third time, and thoroughly worked with discs. Land with a fine, deep tilth as free as possible from weeds is the aim of this work.

Transplanting

From December until January, and sometimes as late as February, the

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Top.—Left: The transplants in the seed bed. In the background the land has been ploughed and worked to receive the transplants. Right: Pulling and selecting suitable plants for transplanting from the seed bed. Poorly-grown plants are discarded. *Bottom.*—Left: Placing the mangold plants on the furrow face. Right: Covering the mangold roots with next furrow.

mangold plants will be ready for transplanting. The farmer does not attempt this work if the ground is dry. Mangolds will not develop well if they are transplanted at too young a stage. Best results are secured if transplanting takes place when the plant roots have begun to swell and are about the size of a man's thumb. The mangolds are planted after the plough, a row being placed every second furrow. The plants are placed about 10 to 12 inches apart. Planters soon become expert at the work, covering the ground at about one-third the speed of a planter of potatoes.

The mangold plants are placed on the furrow face, so that the succeeding furrow just covers the rooting system. Later, some growers will tramp the soil firmly around the roots. Before planting, a good dressing of artifiical fertiliser is applied to the face of the furrow. Quantities applied vary from 5cwt. to 1 ton. A suitable mixture for the Mauku district would be 4cwt. superphosphate, 4cwt. blood and bone, and 4cwt. 30 per cent. potash salts per acre.

There is no set rate and kind of fertiliser for any crop, and again, as for the seed bed, the amount applied will vary according to the soil fertility and the amount of rainfall—the higher the fertility and the less the rainfall the less fertiliser being required. Mangolds respond markedly to heavy dressings of animal manure or well-rotted vegetable material.

Copes with Weeds

After the mangolds are transplanted no further attention is necessary. From that stage onwards the mangolds can cope with the weeds themselves, for they have a great start on them. The soil is fine and intercultivation, by interfering with the rooting system and knocking about the leaves, would do more harm than good.

This system of growing mangolds may appear to incur a large amount of work, but it certainly involves less work than the normal method in weed-seed-infested ground.

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crop competitions that it will produce higher yields than any other variety under trial. The best crops are obtained on well-drained, light soils. Heavy, poorly-drained soils are unsuited to mangold culture.

Method of Growing

The normal method of growing the mangold crop can be described fairly simply. The seed is sown in October in rows 28in apart, either on the flat or on ridges, at the rate of 5lb. or 6lb. per acre. As soon as the young mangold plants can be seen the crop is intercultivated and then hand-hoed to destroy weeds and space the plants about 10in. to 12in. apart. The fertiliser should be applied as described for the seed bed for the growing of transplants, except that it can be varied to include some slower-acting fertiliser, such as blood and bonedust. Several intercultivations and hand-weedings may be necessary to keep the young plants free from weeds. After January the crop is usually far enough advanced to look after itself.

This method of growing mangolds is not likely to be superseded by the transplanting method in districts where dry summers are experienced.

A heap of mangolds ready for feeding. There is no need to cover, because frosts which occur in this district are light.

The mangold plant is a hardy being, It does not suffer much from disease, resisting drought conditions better than other root crops. In low rainfall districts its yield is generally about 20 tons per acre. In wet districts the normal yield is about 40 tons, but in some places, where soil and rainfall are very suitable for mangolds, yields average about 50 tons per acre. There are yields on record of more than 100 tons per acre, but these are most unusual.

The mangold is so commonly grown in England that the term "roots" usually signifies this crop. Hay and "roots" are the basic maintenance fodder of cattle.

Perhaps some day, with intensification of farming, the growing of mangolds will increase to larger proportions in New Zealand.

All photographs were taken on Mr. A. Woolsey's farm at Patumahoe.

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Scour in Calves

Faults in Management Largely To Blame

B. A. TAYLOR, Veterinarian, Dunedin.

THERE are a variety of conditions which may cause scour in calves, and several separate factors may operate at the same time. In all cases, however, a common factor is involved —faulty feeding, either in the nature or the quantity of the food. The basic factor which leads to manifestation of the upset is some disturbance in the digestive tract, and the disease can be divided broadly into two conditions, namely, nutritional scours, and bacterial or "white scours."

It is often difficult, or indeed impossible, to differentiate clinically between diarrhoea due solely to improper feeding and diarrhoea of an infectious type, but in the great majority of cases improper feeding and diet is the dominant cause. Once the scouring is established, however, infection may become the chief factor.

Some Causes

Some calves may scour through eating straw or foreign material or from eating coarse hay at too early an age, and, once started, this may be difficult to control, because the foreign material remains in the stomach for a long time. Scouring may even be induced by changing too early from colostral milk (first milk) to the milk of the herd, that is, before the fourth or fifth day. This latter scour is more or less transient, and, provided infection does not become established, will clear up under treatment within a few days.

Problems in the rearing of calves will arise now that spring is here, and the ills arising from faults in management will become apparent and cause serious loss. The outstanding trouble, both by virtue of its prevalence and its seriousness, is "scour," or diarrhoea in the young stock, and a brief discussion of the cause and effect of this trouble is contained in this article.

The most prevalent cause, however, is the feeding of an excess quantity of milk at each meal, and it is the common factor involved in causing the so-called nutritional scour. Under the normal conditions a calf suckles at numerous occasions during the day, and the quantity taken each time is small. When the calf is pail-fed, however, the number of times of feeding is greatly reduced to three, or even two, feeds per day.

Excess Feeding

The result, if the quantity of food allowed is excessive, is obvious. Being hungry, the calf drinks to excess, with the result that a hard, indigestible curd is produced in the stomach and so irritates the stomach lining that it leads to inflammation and increased activity of the intestine. The food is then forced through the intestinal canal at such a rapid rate that no absorption of food can occur. Outwardly, the disease is indicated by the diarrhoea, with thin, watery, foetid droppings, by the general depression, fever, thirst, and lack of appetite. Inwardly the effects revolve upon the inability of the calf to absorb nutriment and the feverish condition induced by the bowel inflammation.

This condition is most likely to occur in calves from a few days old up to approximately three weeks, but it must be remembered that carefully controlled and systematic feeding is essential much longer than this period, as faulty diet can also give rise to digestive disturbance in older calves.

Vital Factor

"White scours," "bacterial scours," or contagious diarrhoea are the terms employed to differentiate the type of diarrhoea caused by actual infection as distinct from nutritional scours. Again, however, it should be mentioned that the two frequently occur together, beginning as a simple dietetic diarrhoea to which the bacterial infection becomes superimposed.

The vital factor in the establishment of this disease is the multiplication of certain disease-producing organisms within the bowel which rapidly overwhelm the calf, the diarrhoea being produced by the irritant action of the germs and their products on the bowel wall. Once this condition becomes established, thousands of the bacteria are poured out with increased virulence in the foetid droppings and rapidly infect other calves.

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Two Faults

The disease can arise through two faults in management:—

(1) Improper feeding, leading to a digestive upset and enabling the bacteria to become established. The bacteria are present in the intestines of all calves, but normally are kept well in check. Should any conditions such as indigestion—due, for instance, to overfeeding—arise, the bacteria begin to multiply, increase in virulence, and establish themselves as disease-producing organisms.

(2) The feeding of contaminated milk, by which the organisms are poured into the calf's stomach with the food. The latter fault is inexcusable; absolute cleanliness in food and utensils is of paramount importance.

Treatment and Prevention

Treatment and prevention involve the same principles, and are intimately related to the management and feeding. Both nutritional and bacterial scours are responsible for heavy losses through fatalities and by the fact that surviving calves are frequently sickly and unthrifty. A knowledge of prevention and treatment is therefore essential.

The first essential in treatment is the elimination of the factors concerned. A careful study of the dietetic influence in an epidemic of scours shows that consideration for this alone will aid largely in checking disease where other efforts fail. In cases with contaminated food, if the unhygienic conditions underlying are continued it is only a matter of time when heavy losses will occur.

To prevent or treat nutritional scour arising from overfeeding it is essential to reduce the amount of milk fed at any one feed and to feed three times a day for the first three weeks. In the first place, the calf should be fed for the first four or five days on the colostrum, or first milk, from the dam. For the first week feed two pints of milk per feed, that is, six pints per day; in the second week increase to 2½ pints per feed, and in the third week to three pints.

It is a wise plan in prevention to add about half a pint of water to each feed of milk. Feed whole milk for the first fortnight, and at the end of the second to third week the change to separated milk may be begun and completed within one further week. Feed then at the rate of one gallon per 100lb. liveweight.

Should scour develop for any reason, treat immediately by giving a dose of castor oil, 1 to 2 ounces in warm water, according to the age of the calf, and at the following feed allow only warm water which has been previously boiled. Then allow only half the normal quantity of milk (making up the volume with water) for a few days until the condition has cleared.

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Manuring of Root Crops

Elements Taken From The Soil Must Be Replaced

Manurial practice in the growing of root crops is reviewed in this article. The reasons for applying essential manures are discussed, together with the effect on the crops.

THE primary object in the use of manures for crop production is to supply the soil with any plant food of which it may possess only an imperfect store. The producing of our various crops causes a considerable quantity of matter to be removed from the soil, and if these crops are taken away from the land the soil must be impoverished by doing so. It is well known that if the removal of crops grown is continued for any length of time without remedial measures being adopted the soil ceases to produce remunerative crops.

— By —

C. S. DALGLIESH,
Fields Instructor, Rotorua.

Manures are therefore applied to the land to make good as far as possible any injury sustained in the production of crops, and if practicable to increase its productive powers.

The merit of farmyard manure for the growing of crops is well known, but the scarcity of this manure under New Zealand farming methods is such that only limited areas of crops can be grown with the aid of farmyard manure. Where mangolds are grown, the farmyard manure available is generally used for this crop. Therefore we have to rely on the use of artificial fertilisers for the growing and production of our other farm crops.

Plant Food and Soil Fertility

Soil fertility may be defined as the crop-producing power of the soil. It depends on the plant-food content of the soil, climatic and seasonal conditions, moisture, temperature, and cultural methods. Plant food exists in the soil in two forms—soluble and insoluble. By far the larger proportion exists in a condition insoluble in the soil moisture, and is therefore not assimilated by crops. A very small proportion of the total plant food is present in a water-soluble condition, and it is this extremely small percentage which nourishes the crop. This is termed available plant food. The conversion of the insoluble stores of plant food which can be readily taken by the plant proceeds very slowly, and it is the supply of the available plant food which controls to a great extent the fertility of the soil.

The whole world and everything in it is built up of a number of simple substances or elements, some of which exist in great abundance, while others are found in very minute quantities. Again, some of them are found in a free state, so that we can easily see them and handle them by themselves, while others are found only in combination. Although these many substances or elements furnish plant food,

Photo Above—

A swede crop utilised as winter feed for sheep. The fertiliser used was 2 cwt. superphosphate, 1 cwt. bone, and 28lb. sulphate of potash per acre. This crop wintered 2,000 breeding ewes on an area of nine acres for five weeks, with a run-off on to 30 to 40 acres of old pasture.

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it has been found in ordinary farming practice, and has been proved substantially correct by science and field experiments, that nitrogen, phosphorus (phosphates), and potassium (potash) tend to become deficient for crop requirements under normal farming conditions.

Three Essentials

These three are commonly known as the three essentials of fertility, for it has been found that their available stores are more quickly removed by cropping than the others and therefore must be returned or supplied to the soil if fertility is to be maintained or increased. Further, it happens that large tracts of virgin soils are deficient in a reasonable supply of these plant foods, particularly of phosphoric acid; hence the need for applications of fertilisers to virgin soils.

Occasionally, these three recognised plant food essentials are not all that is required, as some soils in their natural state may not contain the full equipment of elements for the production of healthy plants, but such occasions are rare, as in general farming practice it has been found that artificially supplied plant food in the way of phosphates, nitrogen, and potash are all that is required for the production of healthy crops.

For instance, in the general manurial practice for root crops a liberal application of phosphates, together with small amounts of nitrogen and potash, will be sufficient, but on some soils in Great Britain, Canada, and New Zealand it has been found that this well-recognised system of manuring has proved insufficient to produce sound, healthy crops.

Boron Deficiency

This occurs in the growing of root crops on some of our New Zealand soils. Although the land receives excellent cultivation and standard manurial treatment, swede crops will be well grown, but will lack soundness of the bulb which, on being cut, will be found to have dark mottled centres, known as brown heart. Science proved this unsoundness to be due to a deficiency of the element of boron in the soil, an element which is not necessary in ordinary manurial treatment for crops. Boron added in minute quantities to the general manure applied to root crops has invariably proved successful in producing a healthy crop.

Many soils subject to high rainfall have been found deficient in lime. In such districts an application of lime in some form or other may be found essential to productiveness; in fact, lime in such areas may be the limiting factor in crop production.

Functions Described

Each of the essentials, nitrogen, phosphates, and potash, has a separate function to perform in the growth of the plant, and if it is deficient crop growth will be restricted by the lack of that plant food, although the others may be present in ample amounts for maximum production. In other words, there may be present in the soil all the potash and phosphoric acid that the plant can utilise, but with very small amounts of available nitrogen. Under these conditions good crops cannot be grown until the deficiency in nitrogen has been overcome.

Nitrogen promotes more particularly the development of stem and leaf, and is demanded largely during the period of active vegetation, that is, the early stages of growth. A deficiency of nitrogen results in poor growth and yellowish foliage; an excess may induce too large a vegetative growth and retard bulb formation and ripening.

Phosphoric acid influences root development in the early stages and seed and fruit formation in the latter stages of growth. Its importance for turnip and grain crops may thus be explained.

Potash is more widely distributed and less frequently deficient in soils than nitrogen and phosphoric acid, and may be considered the least important from the standpoint of the necessity of application. Potassium performs certain vital functions in plant nutrition. The most important of these, it would appear, is related to and indispensable for the production and translocation of the carbohydrates, starch, sugar, and cellulose, within the plants. Thus crops rich in these constituents, such as mangolds, sugar beet, and potatoes, are those which are especially benefited by potassic manures.

Results of Treatment

Cruciferous root crops are more responsive than any others to applications of phosphates, and it was the many definite responses shown by the swede crop to soluble phosphates which built up the superphosphate and other fertiliser industries. In the Farmers' Field Crop Competitions in New Zealand from 1918 to the present time excellent opportunities were available to note results as to the most successful manurial treatment in the growing of root crops under the many varied soil and farming conditions. Results have definitely shown that no specific fertiliser mixture was continuously successful in the winning crops of high yields. The only common factor throughout the whole

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period in which Farmers' Field Competitions have been conducted is that phosphates were the dominant manurial requirements of turnips and swedes.

In quite a number of instances applications of phosphate alone, applied as available phosphates in the way of superphosphates at rates of 2cwt. and 3cwt. per acre, were all that were required to produce successful results. A review of many of the manurial treatments and yields of the winning crops in these competitions gives excellent information as to the successful results of a different fertiliser mixture. Such manurial mixtures as the following have all assisted in the production of high yields of 35 tons to 60 tons per acre and occasional outstanding yields of 80 tons and even over 100 tons per acre.

Manurial Mixtures

Proprietary turnip manures, 3 to 5 cwt.; superphosphate and bone (equal parts), 3cwt.; superphosphate and bones, 1½cwt.; 1½cwt. basic slag, 1½cwt. superphosphates; ½cwt. of sulphate of potash; one-third each basic slag, superphosphate, and bones 4½cwt; basic super, 3cwt; superphosphate at rates of 2 and 3cwt.; superphosphate 1½cwt, Seychelles 1cwt, basic slag 70lb., bone-flour 20lb., sulphate of potash 28lb., 3 to 4cwt. It is clear that successful root crops of turnips and swedes can be produced with a variety of fertiliser, but that phosphates are dominant in each.

Successful crops are not due merely to the application of the fertiliser applied at time of sowing the crop, but due to the fertiliser and the latent soil fertility of the land, no doubt built up by previous good farm husbandry and made active by the cultivation of the land for the crop. Thus, we find heavy yields following light applications of 1½cwt. to 2cwt. of fertiliser per acre, and crops not so good where applications of similar and also more complete fertilisers have been applied where the latent soil fertility is low.

Highly Topdressed Pastures

In highly topdressed pastures of good stock-carrying capacity the results in swede-growing are often disappointing, the bulbs being small and with much growth of leaf and neck. Highly topdressed pastures are prone to store up nitrogen and make available a too liberal supply, resulting in an overgrowth of leaf and neck. Under such conditions, phosphates alone or phosphates and potash is all that is required. In the use of potash for root crops I have always found that sulphate of potash is preferable to potash salts or kainit.

Quite a number of farmers adopt the practice of omitting the topdressing of pastures the year before the preparation of the land for the swede crop. Applications of lime during the preparatory cultivation will accentuate the liberation of nitrogen stored in the soil. In districts where lime is essential this is better applied to crops or pastures a few years previously, and a more sound and healthy

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crop free from an overgrowth of leaf and neck will result.

As previously stated, there are times when the standard fertilisers of phosphates, nitrogen, and potash do not produce a 100 per cent. crop, brown heart being prominent.

Applying Borax

Applications of borax, which supplies the boron, at the rate of 6lb. to 8lb. per acre, proved very successful in the production of sound crops. The method of applying the borax is by mixing 6lb. to 8lb of borax with the fertiliser to be used. The fertiliser with the added borax should not be allowed to come in close contact with the seed, as the borax has proved detrimental to seed germination. The general farming practice is to sow the borated fertiliser on the land a few days or a week before sowing the crop, and to sow the seed with 1cwt. of fertiliser if it is the custom to sow seed and fertilisers together. Borated fertilisers should not be used in conjunction with a free use of lime. For full particulars of the use of borax see the "Journal of Agriculture," Vol. 53, August, 1936, page 99, and Vol. 57, December, 1938, page 511, and also this issue.

Mangolds

The mangold crop responds to liberal manuring. For best results it requires a plentiful supply of available plant food in the early stages of growth. While the nature and amount of the fertiliser best suited for the growth of any crop will largely depend on the character and general fertility of the soil, it should be kept in mind that the special requirements of the mangold crop are nitrogen and potash. As with turnip and swede crops, phosphates form the dominant fertiliser for mangolds, provided a fair amount of available phosphate (superphosphate) is applied in reasonable quantities, particularly if supported with 3cwt. to 5cwt. of salt of potash and, to a lesser degree, a supply of nitrogen.

The farmer has a wide range of fertiliser mixtures from which to choose and which have proved successful in the production of heavy crops from 60 tons per acre to well over 100 tons per acre in districts suitable for mangold-growing throughout the Dominion. The following fertilisers proved their worth in this respect:—Proprietary mangold manures applied at from 3cwt. to 6cwt. per acre; superphosphate 8cwt., salt 10cwt.; superphosphate and bones (equal parts) 6cwt., plus 5cwt. salt; superphosphate, bone, and basic slag (equal parts) 6cwt., sulphate of potash 16lb; superphosphate and bones (equal parts) 8cwt., 2cwt. salt, and ½cwt. nitrate of soda applied at thinning time; basic slag, bone, and superphosphate (equal parts) 5cwt., sulphate of potash 16lb, salt 3cwt., and nitrate of soda 84lb.; superphosphate 7cwt., salt 5cwt.

Where farmyard manure is applied or the soil contains stored-up nitrogen in a plentiful supply of humus, the need of artificial nitrogen is not essential. Agricultural salt has proved as efficient as applications of potash salts.

Apart from proprietary carrot manures which are on the market and give excellent results, any good phosphate manure or mixture of phosphates and potash used at 3cwt. to 5cwt. per acre is suitable for carrots.

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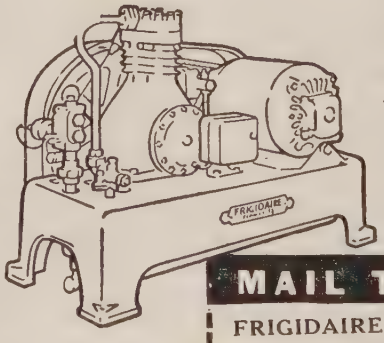

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Milking Shed Equipment

Provision of Boiling Water In a Dairy

IN the previous article on the milking shed electric heaters were under discussion, and it may be advisable to describe some of the points which must be observed in their use if satisfaction is to be obtained.

There are a number of difficulties to be overcome when one sets out to calculate the amount of boiling water which must be provided in a dairy. A fuel heater can be filled a number of times to meet the varying demands, but an electric element will deliver only a certain number of heat units in a given time. If the element is too big the water will boil away, and if it is too small it will not be boiling when wanted.

It is argued by some that as boiling water cannot be drawn through a milking machine it is not necessary to heat it above 185 degrees Fah. Water which is drawn off from a cylinder which is boiling loses a considerable amount of heat before the bucket which receives it is full, and for this reason comparatively large taps must be fitted. If the water in the cylinder is only 185 degrees Fah., it will be considerably lower than that when the bucket is full. Before the bucket is emptied a further loss of heat takes place, the loss depending largely on the number of bails served by the bucket.

The aim when scalding out a milking machine is to have the water in the bucket at the highest temperature at which the vacuum will draw it through the pipes, and experience has shown that the best milk and cream is received from those dairies where boiling water is available.

In addition to the milking plant there are many other utensils in a dairy which must be scalded either by immersion or by pouring the water over them, and only boiling water is satisfactory for this purpose.

Two Standards

There are two standards which must be maintained in the dairy industry. A utensil is clean when it is free from visible dirt, and should be as nearly sterile as the ordinary means available can make it. If water is the only means available, it must be boiling water, and no reduction from these standards can be accepted.

Some of the conditions which present difficulties in meeting all requirements when electricity is used are seasonal and daily variations in atmospheric temperature, seasonal differences in the size of the herd, difference in interval between milkings, uneven requirements for washing up between night's and morning's milkings, and difference in the requirements of cream and milk supply dairies.

The first two are influences which cannot be provided against. On some farms there is practically no difference in the time between milkings, but on others there is a very wide difference, and the water heating period will vary accordingly. There is not a great deal of difference between the night and morning requirements on a home separation farm, but on a farm which delivers milk more boiling water is required, and this extra quantity is needed in the morning when a number of large milk cans have to be washed and scalded.

Some Discrimination

Under these varying conditions some discrimination must be exercised if the best results are to be obtained from an electric heater. In a home separation dairy with an even period between milkings the cylinder can be filled after each milking.

If there is a long night interval and a short day interval the cylinder must be of such a size that it can be filled at night. After the washing up is finished in the morning there should

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be some boiling water left in the cylinder. The cylinder should then be filled with a quantity of cold water, which will boil before the night's milking and will be sufficient for the night's washing up.

In the milk supply dairy with an even period between milkings the cylinder provided is sufficient for the quantity required in the morning, but a carry-over of some hot water at night may be necessary to ensure that this quantity is boiling when required. With an irregular period, a full cylinder should boil overnight, while a partly filled cylinder can be heated during the day.

It will thus be seen that some thought must be given to these points if the best results are to be obtained from this method of heating, which has the advantage that, if handled properly, the boiling water is available when wanted without effort on the part of the user.

Responsibility

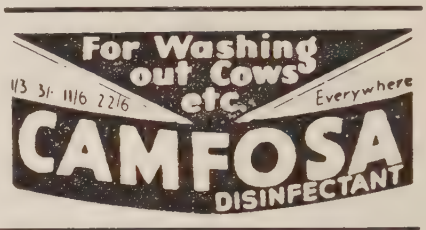
Under the Dairy Regulations the responsibility for the installation of a heater is shared conjointly by the purchaser and the person erecting it. There is no restriction on the installation of a heater with suitable element which exceeds the scheduled sizes.

Hot water from a factory which is taken home in the milk cans is quite inadequate for cleaning a milking machine. The right time to do this work is immediately the milking is finished and before the milk dries, and by the time water from the factory reaches the farm it is no longer hot and is therefore useless for the final scalding of the plant. The Dairy Regulations require a suitable plant for the boiling of sufficient water near the machine. This stipulation rules out water from the factory or from the house, which may be some distance from the shed.

Milking Procedure

We have now reached the point where something should be said about the actual milking procedure. Reference has already been made to the advantage of hosing down the yard before the cows are brought in. Some yards recently built have an approach race in which a foot bath is constructed in the concrete and through which all the cows must pass. The water in this bath should be replenished daily. Warm, or at least cold water, should be drawn through the milking plant before milking is started. Boiling water is even better.

The appearance of the dairy will generally give an indication of the class of milk produced in it—the condition of the leg-ropes and stools for instance. It should not be necessary to mention the necessity for washing the teats and udders with clean water in which a pinch of Condys crystals has been dissolved, using a clean cloth or, better still, a hose and sponge pad. The teats should then be dried. It may not be out of place to repeat that the Act requires that no milk which is tainted or which has been drawn from a cow which is diseased or has calved



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After milking is finished the washing of the plant and utensils should be undertaken at once, as it is easier to make a thorough job at that stage than later in the day. This will not be a difficult task if the milking plant has been correctly installed and the necessary conveniences provided. The original claims for the releaser plant, that all that was required was to draw a few buckets of warm water through, were quite wrong. The later theory that a more or less perfunctory cleaning after each milking, with complete dismantling of the machine once a week, was equally wrong. Bulletin No. 118, procurable post free from the Department of Agriculture, describes the present-day system. If followed, this will keep the milking plant clean all the time with a minimum of labour.

It may be well to state the things which should not be done. Do not put hot water or steam through the machine before it is washed; this will cook the milk on and cause a deposit of milk-stone. Do not use hard brushes or scrapers in the milk tubes; they will destroy the smooth inner surface. Do not use a caustic soda solution which is stronger than one teaspoon to four gallons of water. Do not neglect to wash the air system as well as the milk system.

Tarpaulin Dressing

E.W. (OKAIHAU):—

Could you please advise me what to use for preserving a tarpaulin to be used on a hay stack?

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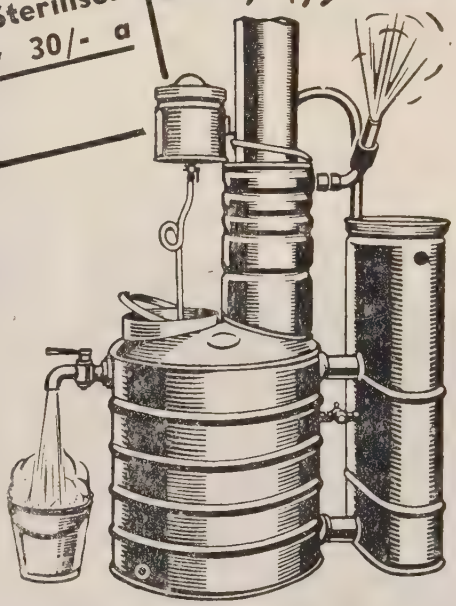

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Grasses and Clovers of New Zealand

Species Which Thrive In Wet and Damp Conditions

S. H. SAXBY, Instructor in Agriculture, Dunedin.

(*Continued from September issue.*)

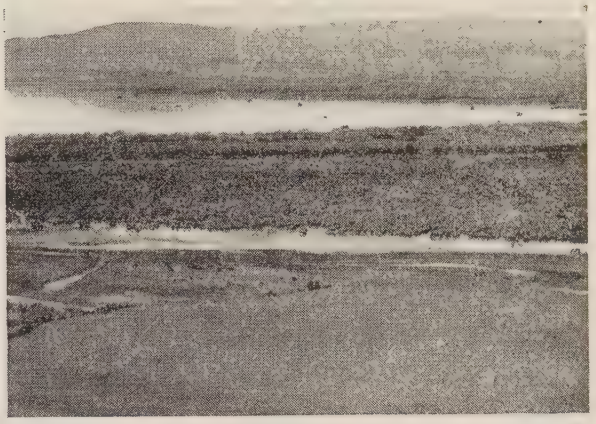


Fig. 13.—Certain grasses will thrive on very wet or flooded country where many of the more common grasses will die. Each grass described has a definite sphere of usefulness.
[*S. H. Saxby, photo.*

This article is the second of a series on the main constituents of New Zealand pastures. This month the author describes the grasses which thrive on the margins of lakes, lagoons and swamps, and shows that in certain parts of the Dominion they provide favourable feed for stock.

Reed Sweet Grass (*Glyceria aquatica*). — In general appearance this grass is somewhat like raupo, and will thrive under very similar conditions. It is to be found in low-lying pastures which border slowly moving water. Here it will grow and thrive for a considerable distance in each direction from the water's edge, its outward limit being about 4ft. of water, although it will stand more during the winter. Reed sweet grass will also grow quite well on firm soil, provided that the water table is high and constant. It is erect growing and twitchy, spreading by means of stout short underground runners. Being a very free seeder, it also spreads by this means.

Fig. 14.—Left: Reed sweet grass. *Right:* Floating sweet grass. These two closely-related water-loving plants increase both by seed and by rhizomes.
[*H. Drake, photo.*

Reed sweet grass is dormant throughout the winter, but is fairly hardy in the warmer parts of New Zealand and remains green during this period. The amount of feed that it produces is very large, individual plants measuring up to six or eight feet in height when mature.

Because of its strong-growing nature this grass rapidly becomes dominant in habitats which suit it, smothering out the finer grasses or rushes.

Method of Grazing

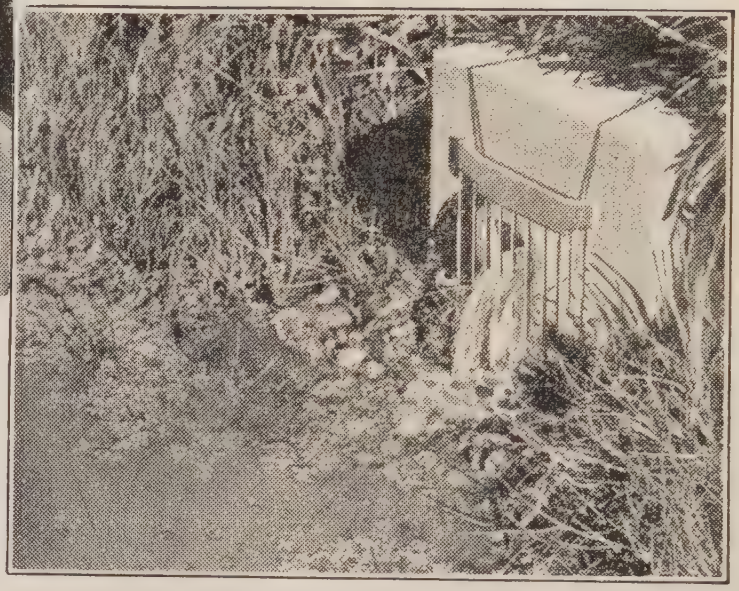
The herbage, when mature, is not attractive to cattle, and is of use mainly for store animals. When short it is eaten much more readily than when rank, and is considerably more nutritious. Reed sweet grass is frequently regarded as being unpalatable, but this is almost certainly due to the fact that the grazing of the young growth is often difficult because of the depth of water in which it is growing, and when grazing is possible in the early summer the grass has become rank and gone to seed. On this account the first grazing of the season should, if possible, be carried out by dry cattle, which will reduce it to a state suitable for grazing by milking cows.

Briefly, reed sweet grass is a valuable plant which will form a pure association under conditions that are too wet for any other useful grass to thrive, and consequently its introduction is warranted on country which will support stock but which is under water for much of the year.

It should not be introduced where it is likely to interfere with watercourses, as it is nearly as bad as floating sweet grass in this respect. Reed sweet grass is not likely to be confused with any other grass, but may be mistaken for raupo (*typha angustifolia*). It may be distinguished from this by its much brighter green colour. The sheath is entire and is rough to the touch. The leaves are folded in the shoot and are usually rough. There are no auricles, and the ligule is short.

Subject to Frosts

Mercer Grass (*paspalum distichum*).—As its name implies, this grass is common in the swamp pastures of the lower Waikato basin. It also occurs in several other districts in the Auckland Province. Its climatic range is somewhat more restricted than that of *paspalum dilatatum*, and is confined to those districts that do not experience such severe and prolonged frosts as *paspalum dilatatum* will stand.



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The soil fertility and moisture requirements of *paspalum distichum* are similar to that of reed sweet grass, that is, it will thrive under conditions ranging from permanent water to firm land with a continuously high water table. It is not as coarse a grass as reed sweet grass and is eaten readily by cattle. The amount of feed that it produces is large, and, the different habitats considered, it produces at least as much as *paspalum dilatatum.*

Like other plants of the same genus, this grass is late to start growth in the spring, and is consequently of greatest value as a summer fodder. On swamp country in the Auckland district Mercer grass is very valuable, and in some parts has become the dominant plant over considerable areas. As it is a twitchy type of grass and spreads by means of underground runners, it may be readily introduced into suitable country by means of gathering and transferring these runners during the early summer in order that they may be well established by the succeeding winter.

Mercer grass may be confused with *paspalum vaginatum.* The leaves are long, broad, flat and usually hairless except at the base. The ligule is short and square-cut. The sheath is flattened, and is hairy on the upper surface.

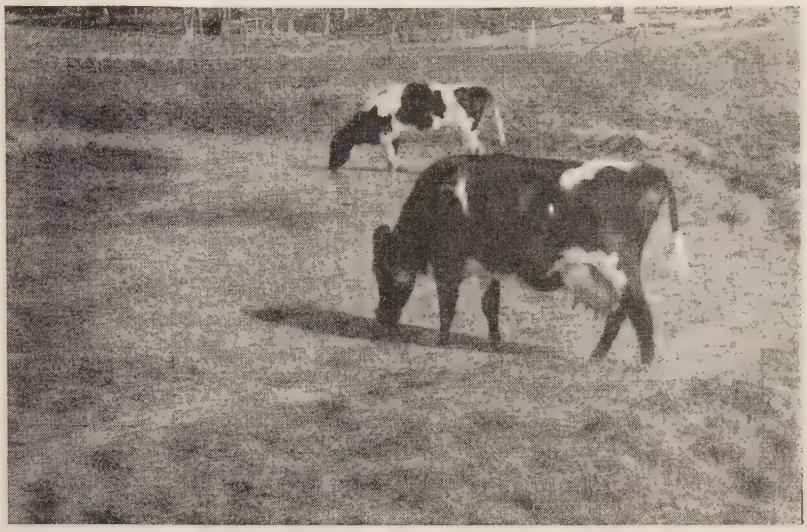

Fig. 15.—Floating sweet grass is common as a volunteer on the wetter portions of low-lying pastures in most parts of New Zealand. Cattle relish the herbage produced by it.

[*S. H. Saxby, photo.*

Floating Leaves

Floating Sweet Grass (*Glyceria fluitans*).—This ranks very close to reed sweet grass with regard to moisture requirement and tolerance. It will not stand as much water or as prolonged periods of submergence as will reed sweet grass, but will grow on country with a slightly lower moisture content. It is very common and widely distributed throughout New Zealand, occurring in watercourses, shallow lagoons, and the wettest portions of damp, low lying pastures.

A valuable feature of sweet grass is its ability, when submerged during the winter, to produce long trailing stems, the leaves of which are able to float on the surface of the water. Under these conditions it is able to provide a large quantity of feed which is relished by cattle, which will wade considerable distances in order to obtain it. When the flood waters recede, and, during the summer months, floating sweet grass resumes a more dense habit and produces a large amount of feed, which is the most palatable produced by any of the common grasses.

In common with other water-loving grasses the production from floating sweet grass falls off rapidly as soon as the moisture supply becomes too low. The drainage of wet land invariably eliminates all of this grass except along the edges of the ditches.

As a pasture grass, floating sweet grass fills a valuable place where soil moisture is too high or too irregular to support meadow foxtail, and where it is not sufficiently wet to maintain reed sweet grass.

Fig. 16.—During the winter the long leaves of floating sweet grass float on the surface of the water. The leaves are enabled to do this, as they are provided with a number of air cells, which may be seen when the leaf is viewed against a fairly strong light.

[*S. H. Saxby, photo.*

Danger to Drains

Although this grass is valuable for wet pastures it is classed as a weed when occurring in drains because of its habit of spreading rapidly and in

some cases making a bank to bank cover. This cover is frequently responsible for the slowing down or even complete stoppage of drains when the fall is slight.

The clearing of floating sweet grass from watercourses should, if possible, always be undertaken in the late summer. The water is then at a low level, making the clearing less difficult. This also enables the grass to be cleared away at the end of the growing period, thus leaving the drains open for the winter, during which time its growth, although appreciable, is small, especially in the colder districts.

Although it sets seed very freely the seed of floating sweet grass is seldom, if ever, saved in this country, largely because of the demand for it being negligible, because it now occurs naturally in practically every place to which it is suited.

In areas where the free passage of water is of no moment and where it does not already occur the introduction of floating sweet grass by seeds or roots is warranted. It establishes and spreads quickly by either means.

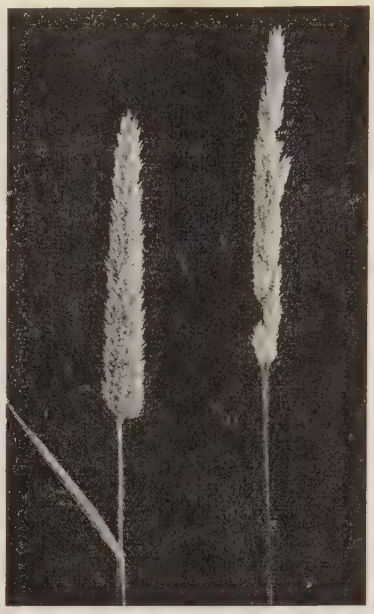

Fig. 17.—Left: Phalaris tuberosa. Right: Phalaris arundinacea (reed canary grass). The latter grass is adapted to wet condition, and is of a twitchy nature. The encouragement of it is warranted on country which is not likely to be ploughed.

[*H. Drake, photo.*

Floating sweet grass is a very distinctive grass, and is not liable to be confused with any other grasses when growing in its natural habitat. During the winter, when the ground is flooded, it may be easily recognised by its long trailing leaves, which float on the surface of the water. If a leaf is held against a bright light the small air cavities which are responsible for its buoyancy may be seen. The stem is flattened, and the ligule is long and milky-white in colour. There are no ears, and the plant is hairless.

An Aggressive Grass

Reed Canary Grass (*Phalaris arundinacea*). — This is a tall-growing, coarse-leaved, semi-aquatic grass with a habitat range between that of reed sweet grass and meadow foxtail. Where there is an ample supply of moisture it spreads fairly rapidly by its strong-growing rhizomes. Although used to a considerable extent in parts of America, it is seldom sown in New Zealand, and occurs only in isolated patches throughout the country.

Reed canary grass is essentially a swamp grass, and should be introduced

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into this type of country only. Because of its twitchy nature it will form a good solid and stable turf. The amount of feed it produces is large, and is eaten quite readily by stock. It is more aggressive and earlier in commencing growth than is reed sweet grass, and in some cases has competed successfully with rushes and blackberry.

Reed canary grass is a hairless perennial grass which creeps by means of rhizomes, the scales of which are of a pink colour. The sheath is round in section, and the leaves are long, broad and ribless above. The ligule is long and ragged. Ears are absent.

Recent Introduction

GRASSES WHICH THRIVE UNDER SALINE CONDITIONS.

Spartina Townsendii.—As a pasture grass, this is a comparatively recent introduction into New Zealand, where its use has not yet been sufficiently general to form a final opinion regarding its value. Its habitat range is very narrow, being limited to loose and raw mud below high-tide level. Its main value, therefore, is in its ability to establish and thrive under periodical light submergence by sea water. Under these conditions the grass will, in time, collect and grow through sufficient mud to raise the level of the land above the tide mark.

Fig. 18.—Tidal inlets are common on much of our coastal country. Here the choice of useful grasses is very limited. Several grasses are, however, of value under these conditions.

[*H. Drake, photo.*

In parts of Europe this grass has been used with great success for this purpose. Its performance in this country is encouraging, and, if successful, it should be the means of reclaiming considerable areas of now unproductive mud flats.

Although it is a fairly vigorous grower, it will not stand competition from strong-growing plants, and on this account must be regarded as a pioneer grass, paving the way to a more stable pasture of creeping bent, *puccinellia* species and strawberry clover.

Puccinellia Species (*Salt Grass*).—Several species of this genus are quite valuable grasses on saline country just above high water mark, where they grow in association with buckshorn plantain and *salicornia*. They are eaten quite readily by stock, although during the summer they become harsh and dry. They are useful in that no other grass will thrive under these saline conditions. The introduction of strawberry clover as an associate would be beneficial, and would result in the fertility conditions being made suitable for creeping bent and better grasses.

In general appearance these grasses are not unlike Kentucky bluegrass, but they are more erect and are not of a twitchy nature. They also have a lighter greyish green colour.

(*To be continued.*)

Fig. 19.—Salt grass thrives on mud flats where practically no other grasses will grow. It is eaten quite readily by stock.

[*S. H. Saxby, photo.*

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A very severe case in which small cracks have occurred, marking the outer limits of the diseased zone.

Brown Heart in Swedes

Minimum Application of 15lb. Borax Per Acre Will Usually Give Satisfactory Results

P. B. LYNCH, Asst. Crop Experimentalist, Fields Division. Wellington.

DURING the 1937/38 season 21 experiments on "brown heart" were instituted by the Fields Division in various swede-growing districts throughout New Zealand. In general the object of this work was to confirm the results from trials conducted in previous years. These experiments had shown in the majority of cases that satisfactory to complete control of "brown heart" or "mottle heart" of swedes could be secured by applying small quantities of borax. However, the experiments of the season under review were designed to discover the **minimum quantity** of borax required to give satisfactory control of the disease, and also to investigate the effect, if any, of this substance on the yield of swedes.

Experiments conducted by the Fields Division with the use of borax as a means of controlling brown heart in swedes have shown that 15lb. of borax per acre, broadcast after sowing, will usually give satisfactory results, but for unknown reasons the treatment seemed to have little effect in some localities.

The results of the trials in the Rotorua district were summarised in the "Journal" for December, 1938, and will be briefly referred to. This article, among other things, emphasised the severe germination injury which might result if the borax was allowed to come in close contact with the seed at sowing.

Special small-scale trials at the Marton experimental area were laid down to investigate germination injury and to devise ways and means of overcoming it. As yet, however, the results of these trials are inconclusive.

A typical case of brown heart in swedes.

and in the meantime it would seem that the safest application is broadcasting the borax after sowing.

Field Trials

The field trials were of two types, the lay-out of which was as follows:—

Type "A": Borax broadcast in single plots ½ chain wide at rates of 10 lb. 15 lb., 20 lb., and 30lb. per acre, and compared with "no borax." Disease counts were taken at harvest.

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Type "B": Five plots each ½ chain wide, dressed with borax at 15 lb. per acre and alternated with plots receiving no borax. Disease counts and yields taken at harvest.

Due to a variety of causes, mainly dry rot infection, six of the trials had to be abandoned. No information could be secured from one trial in which there was no mottle heart infection in the control or "no borax" plots, as well as in the treated plots.

Detailed results are as follow:—

TE KUITI DISTRICT.

Treatment: Borax at lb. per acre	% of bulbs with mottled heart	
	Te Kuiti	Kio Kio
Control	77	88
10	54	66
15	50	36
20	52	29
30	60	25

The yields in tons per acre at Te Kuiti were 27.7 on the control plot and 29.7 on the plot treated with 15 lb. of borax. This increase was statistically significant. The variety of swede was Suttons Masterpiece.

HAMILTON DISTRICT.

The trial at Puketaha (variety of swede, Superlative) showed no mottle heart infection, while, due to various secondary diseases, the percentage of mottle heart could not be determined with any accuracy at Ruakura. Here, both varieties, Success and Superlative, were sown. It is interesting to note, however, that at Ruakura there appeared to be little difference in the percentage of plants affected by mottle heart in the treated and in the untreated plots.

Treatment at Karamu: borax at lb. per acre	% of bulbs with mottle heart
Control	5
10	2
15	2
20	nil
30	nil

It appears that the disease was not serious on any of the areas examined in the Hamilton district. At Karamu both Superlative and Vilmorin varieties were sown. Vilmorin swede appeared to be somewhat resistant to attack.

ROTORUA DISTRICT.

Treatment	% of bulbs with mottle heart	Yields in tons per acre
Tokoroa—		
Control	92	31
All borax treatments	nil	34
Rotorua—		
Control	89	31
All borax treatments	nil	43
Kaharoa—		
Control	87	no weights taken
All borax treatments	nil	

Borax has been remarkably successful in the control of mottle heart in the Rotorua district, and the incidence of the disease appears to have been heavy in this region.

HAWKE'S BAY DISTRICT.

Treatment at Kotemaori: borax at lb. per acre	% of bulbs with mottle heart
Control	50
10	70
15	50
20	50
30	40

In this particular trial borax appears to have been ineffective in the control of the disease, and it is difficult to offer any explanation for the apparently anomalous result, although the soil conditions were very wet.

BALCLUTHA DISTRICT.

Locality	Treatment	Percentage of bulbs with mottle heart	
		Type "A" trials	Type "B" trials
Pukeawa (variety, Superlative)	Control	5	17
	All borax treatments	nil	Borax 10lb., 1
Glenomaru (variety, Masterpiece)	Control	37	19
	All borax treatments	nil	Borax 10lb., nil

INVERCARGILL DISTRICT.

Treatment: Borax at lb. per acre	Percentage of bulbs with mottle heart.			
	Myross Bush	Winton	Heddon Bush	Isla Bank
Control	100	up to 30	"heavy infection"	20 to 50
10	15	nil	2	2
15	2	nil	1	nil
20	6	1	nil	nil
30	4	1	4	1
Variety of Swede:	Superlative	Masterpiece	Magnum Bonum	Masterpiece

Summary

The foregoing results may be summarised as follows:—

(1) Of the 21 trials laid down, six were not harvested. Of the remainder, two trials gave little or no control of mottle heart. in three instances borax gave fair control, and in nine excellent control of the disease.

(2) It appears likely that 15 lb. of borax per acre broadcast after sowing will usually secure satisfactory control of the disease.

(3) Good results were secured in the South Island and at Rotorua, while in the King Country and Hawke's Bay borax appeared to have had but little effect. The reason for this is obscure. In the Waikato mottle heart was not very prevalent on the experimental areas and, in consequence, it was difficult to obtain a true estimate of the effectiveness of the borax dressing.

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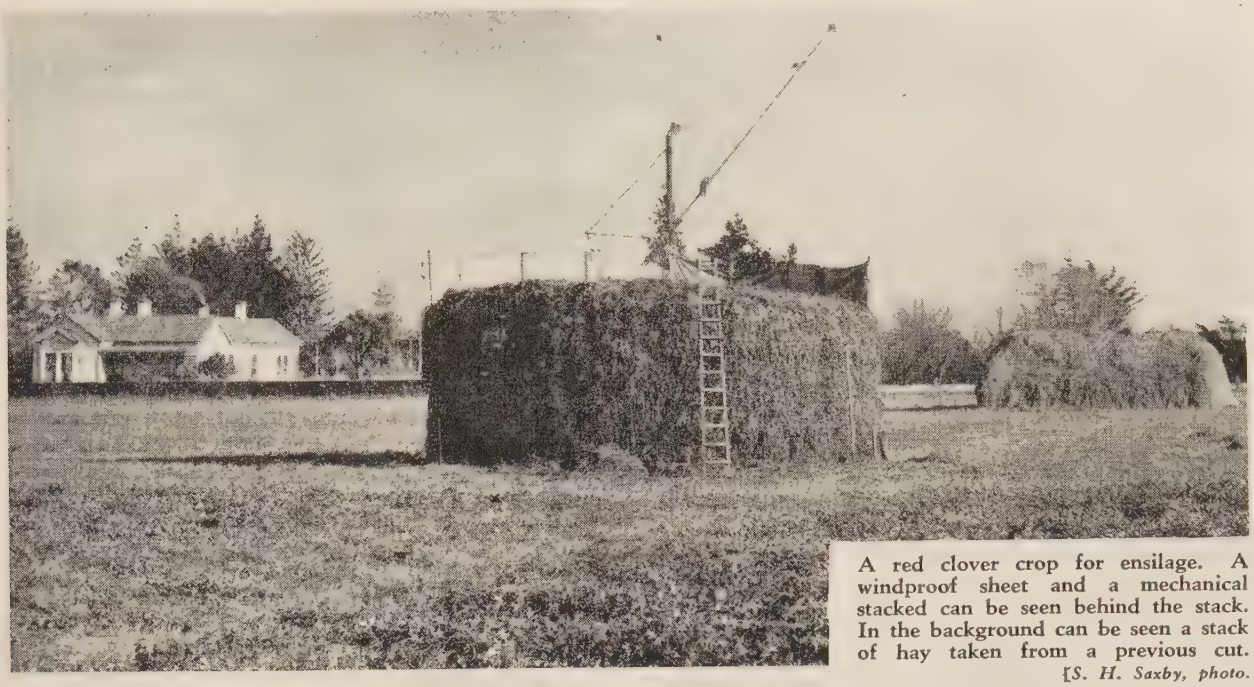

A red clover crop for ensilage. A windproof sheet and a mechanical stacked can be seen behind the stack. In the background can be seen a stack of hay taken from a previous cut. [*S. H. Saxby, photo.*

Use of Ensilage in Southland

Manufacture Is Not Difficult, And Hazards of Haymaking Are Eliminated

W. L. HARBORD, Fields Instructor, Invercargill.

THE evenly distributed rainfall of the coastal areas of Southland renders haymaking a hazardous task, and this fact, together with the short growing period of the province, partly explains why haymaking is not undertaken to greater extent in this locality. It has been found, too, that when there is a surplus of grass, farmers in many cases prefer to harvest for a seed crop, retaining the threshed straw for hay, although such feed is of a much less palatable and nutritious nature than properly and carefully cured hay.

Haymaking in these particular localities, because of the unsatisfactory weather conditions, becomes an exacting and very frequently an expensive task in view of the various handlings required.

Taking into consideration the many difficulties facing the Southland farmer in this connection, it is difficult to understand the apparent lack of enthusiasm and interest in the greater development of ensilage. Dairy farmers, particularly, would no doubt find ensilage of great advantage, especially in the winter months, when stock are mainly being fed on turnips and from the not altogether satisfactory straw stack.

Haymaking in Southland is accompanied by many hazards, and it is considered by the author that ensilage offers a more profitable practice. If reasonable care and good judgment are exercised the making of ensilage is not difficult. and Southland farmers would be well advised to grow special crops for this purpose. Comprehensive details for the manufacture of ensilage are discussed by the author.

Contrary to what appears to be the belief of some farmers in this district, ensilage is not difficult to make provided reasonable care and good judgment are exercised, and it may be said that under Southland conditions, at least, ensilage has some definite advantage over hay, especially when the actual making of either type of fodder is considered.

Points in Favour

Let us consider the following points in favour of ensilage.

(1) The material for ensilage may be cut when the crop is just at the correct stage—more particularly does this apply to grass crops.

(2) The actual stacking need not be affected by inclement weather conditions. Indeed, when material has been cut very dry it is to advantage if a few showers of rain fall while stacking is being carried out.

(3) Practically any crop may be utilised for ensilage. Even the potato crop can be ensiled.

Although, until recently, Southland farmers have not practised the manufacture of this important fodder to any great extent, it is interesting to record that several of them have during the 1938-39 season made ensilage with varying degrees of success. Some farmers began this work without first getting authoritative advice on the correct procedure to be adhered to, and in some cases with far from satisfactory results. As already stated, ensilage is not difficult to make if care and judgment are exercised, but one must first become conversant with the many obstacles which may be encountered.

Correct Temperature

Let us first of all consider a few of these obstacles. One of the most frequent causes of poor quality ensilage is an insufficient understanding of the correct temperature required and the means by which this temperature may be increased or lowered. When stacking is begun the object on the first day should be to stack sufficient material to make a stack about eight or nine feet high. This is allowed to stand overnight, or longer if required, so that the stack will settle down and the process of fermentation will cause a heating in the stack. The desired temperature is somewhere between 120deg. and 130deg. Fah., as it is at this heat that the best ensilage is made.

Although those with experience dispense with the thermometer, farmers who are making ensilage for the first time are advised to check the temperature, and before beginning to build on to the first day's stacking they should take a temperature reading. This is best done by the following method. At the completion of the first day's building a 6ft. length of piping should be driven into the heart of the stack and by means of a string a thermometer lowered to the bottom of the piping. Before the commencement of work the following day the thermometer should be pulled out and a reading taken, and if the temperature is up to the desired point the piping should also be pulled out and stacking operations begun.

Should it be found that the temperature is not up to the required point then stacking should not be started until it has risen sufficiently. It is sometimes found that the heat may be far in excess of 130deg. Fah., in which case the sooner more bulk of material is added the better.

Effect of Wind

Another point to be considered regarding the temperature is whether a constant wind is blowing on the stack while stacking is in progress. This, of course, does not concern the first

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day's stacking to any degree, but it is known that a constant wind on one side will blow through the stack and drive the heat through to one side, causing uneven heating and possibly causing the stack to fall over through uneven settling. To avoid this, a sheet of sacking or canvas should be hung on the windward side of the stack.

When all the material is in the stack or, if more than one stack is to be built, when it is considered that sufficient material has been put into one stack the top should be weighed heavily in a manner that the material near the top will be made to sink down and so cause the exclusion of air from the stack as much as possible. The most common method is to throw earth on top of the stack. This earth should be distributed over the top surface so as to allow pressure of weight out to the very edges of the stack. It will be found best if the earth is built up so that about 15 inches are in the centre, gradually tapering out to about 12 inches on the outside edges. To keep this earth from falling off the stack, sods are sometimes built round the outside, forming a huge ring of firm earth about the edges and inside of which the remainder of the earth is built up.

Another method is to have manure bags filled with earth placed about the outside of the stack. This also proves very satisfactory. Still another method —and one which is very efficient—is to have a length of ordinary fencing wire laced through each of the sides of a sufficient length of wire-netting to encircle the top of the stack. Part of the earth is thrown on to the stack, and the netting is then placed in position so that one-half of its width is about the stack and the other half is free. The wire which is now about the stack is tightened with a strainer, thus preventing the netting from slipping down. The wire on the top or free side of the netting is then made sufficiently tight to keep the netting more or less rigid, and following this the remainder of the earth is thrown on the stack. In this way earth can be held in position right out to the very edge.

Before any earth is placed on the stack it is advisable to cover the top of the material with a layer of straw or hay, for by this means none of the actual silage will become dirty or impregnated with soil, which would make it less appetising to stock.

Manufacturing Methods

There are several ways of making silage, namely, by the use of a silo, a pit, a trench, or an ordinary stack. Of all these four methods, which are used to greater or lesser extent throughout New Zealand, stack silage is the most common. This is a simple method by which good ensilage is made providing the stack is well built.

In building a stack for ensilage the aim should be to keep the outside layers firm and evenly built, while the centre of the stack should be kept just level with the outside and not higher, as would be the case in building a straw or hay stack. By making the outside firm there is less chance for air to penetrate into the stack, and thus good ensilage is the result to almost the very outside edges. This method has an added advantage in that the stack can be built just where required and long haulages of material are not necessary, as is often the case when the pit or silo are used.

The Pit

The pit is another method from which good results can be obtained, but it is necessary for the farmer to have a piece of ground suitable for the building the pit before it can be considered. This method is to be recommended where a suitable hillside or side of a bank will allow a deep pit to be dug out and also allows easy

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access to the ensilage when it has to be fed out, and providing it can be filled from above. In making a pit the farmer must remember to make an opening sufficiently large for a dray to be backed in at the bottom; otherwise difficulty will be experienced in loading the ensilage.

When making the pit it should also be borne in mind that better ensilage and less waste will result in a round pit than will be the case in a square pit. With the square pit there is greater difficulty in packing. The walls of the pit should have a batter of about one in 15 feet. If the pit is to be permanent the corners of the opening should be cemented to carry the timber which is used to close the opening as the pit is filled. Where it is to be of only a temporary nature, however, a good, stout post against either corner will hold the timber in place.

The Silo

The silo is the best means of making ensilage, but it has the disadvantage of a fairly high initial expense, for it has to be solidly constructed. If a cutter and elevator are used the cost of filling the silo is considerably reduced. The silo should, if possible, be partly built into a bank, so that hoisting is reduced to a minimum.

Until comparatively recently the work connected with making ensilage always called for hard labour and, with the exception of the pit filled from the top, much heavy lifting. Today, however, this heavy work on the part of both man and the horse can be considerably reduced if suitable sweeps and mechanical stackers are used. The sweep is undoubtedly the best means of transporting the material to the actual place of stacking, and the mechanical stacker is undoubtedly a great labour-saving device in lifting the material.

Definite Place

There is no doubt that ensilage has a definite place in the farm practice of the Southland farmer. The haymaking season of 1938-39 has definitely proved that the Southland climate does not always lend itself to this work. Farmers during this particular season experienced much difficulty with haymaking, and in the majority of cases the hay made was so frequently wet and handled before stacking and so frequently stacked in an imperfect condition that it has resulted in hay of a poor type and hay which is little better than dried straw. There is little doubt that the crops used for hay would have cost less in labour expense and would have resulted in a truer form of fodder if they had been made into ensilage.

Farmers in Southland would be well advised to grow special crops for ensilage. The most suitable crop in Southland is one of oats and peas, which should be sown at the rate of three to four bushels of oats and one bushel of peas per acre. This mixture, when grown in the best proportions of about one-third the bulk of peas to that of oats, supplies ensilage or hay of good nutritional value, in that it supplies a comparatively well-balanced diet of proteins and carbohydrates. The crop should be sown in the spring and cut down when the oats are in the milk stage and the peas are as near to full pod as possible.

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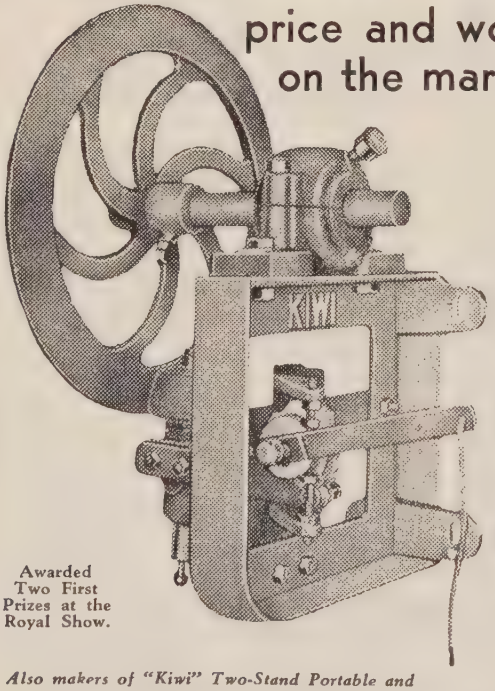

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Topdressing Wheat With Nitrogen

Spring Applications on Yellow Crops

— By —

L. W. BLACKMORE,

Instructor in Agriculture, Christchurch.

One of the trial plots of wheat.

THE value of nitrogenous fertilisers for wheat has been the subject of careful experimentation for the past thirteen years. The earlier experiments carried out by the Department of Agriculture between the years 1925-1933 were designed to ascertain whether the topdressing of wheat in spring with nitrogenous fertilisers could be recommended as a general practice. While the earliest trials gave promise of substantial and profitable increases in yield, later experiments did not support these results. As a result of this work, however, many points were cleared up and a great deal of valuable information obtained.

It was found, for instance, that seasonal effect was a very important factor, and that dry weather following an application almost invariably resulted in smaller increases in yield. It was also found that greater responses were obtained where wheat followed a cereal crop than where wheat was sown after a fed-off crop such as turnips or rape.

More recently, experiments in which nitrogenous fertilisers have been sown together with superphosphate at seeding have shown that there is a serious risk of germination injury where this method is employed.

During the past two seasons experimental work has been confined to the spring topdressing of yellow wheat crops.

During the past two seasons investigations have been made by the Fields Division into the spring topdressing of yellow wheat crops with sulphate of ammonia. In the past year four of the five trials showed significant responses, but in the second year under dry conditions marked increases were obtained in only two out of the five trials.

Indications of Nitrogen Deficiency

A yellow, stunted appearance of wheat in the spring is considered to be an indication of nitrogen deficiency, and a topdressing of nitrogenous fertiliser will generally bring about a marked improvement in the colour and growth of the crop.

Factors Regulating Responses

Weather conditions exert a very important effect on the nitrogen content of the soil. Heavy autumn and winter rains result in excessive leaching of the soil nitrates, which are the most soluble of all plant foods, and are, in consequence, readily washed out of reach of the plants or carried away in the drainage. Where a soil has a limited reserve of nitrates, either because of naturally low fertility or as a result of overcropping, the critical point of nitrogen starvation is more likely to be reached.

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However, the richer soils and those soils in good heart generally are in a better position to make good any deficiency in nitrogen once ground temperature rises sufficiently for the normal soil processes to function. By acting on the humus or partially decomposed organic matter of the soil, the soil bacteria liberate nitrogen in a form which is readily available to the crop.

That fertility level determines to a considerable extent the amount of leaching a soil can withstand before yellowing of the crop occurs is supported by observations made on the appearance of wheat crops on all classes of soil last spring. After a very wet autumn and winter wheat on the heavier soils, especially those of a more friable nature, came through the winter in good condition, and even in paddocks where partial drowning out occurred the surviving portion of the crop did surprisingly well. It was mainly on the medium and light soils that the yellow crops were found. Yellowing, however, was most prevalent north of the Waimakariri River on soils of low organic matter content. From the beginning of October onwards the condition was fairly widespread in certain areas.

Relationship

The relation which exists between fertility level and the nitrogen reserves of the soil is brought out by the series of experiments on the spring topdressing of wheat carried out over an eight-year period between 1925 and 1933. These trials showed that where wheat followed a cereal crop the average increase in yield from topdressing was 4.3 bushels per acre, but where turnips or rape was the prior crop an average increase of only 2.1 bushels per acre resulted. These results are explained by the fact that cereals require a large supply of nitrogen for leaf development and, unlike fed-off crops such as rape or turnips, put nothing back into the soil.

In general, it can be said that where wheat is grown on land of low organic matter content and is subjected to heavy winter rains and low temperatures, conditions for the appearance of yellow wheat are favourable. The degree of response to nitrogenous fertilisers applied as a topdressing in the spring would appear to depend on subsequent weather conditions.

Experiments in 1938-39 Season

In all, five trials were laid down in Canterbury to determine the effect of spring topdressing with sulphate of ammonia on wheat apparently suffering from nitrogen deficiency. The first trial this season was not laid down until September 28, while the period of topdressing for the ten trials carried out over the past two seasons ranged from September 27 to October 10. As the nitrogen requirement of the plant is greatest when it is making rapid leaf growth, yellowing does not usually show for some time after spring growth has begun.

In last season's trials sulphate of ammonia was applied at the rate of 1 cwt. per acre to six plots each 56 ins. by 7 yards. At harvest the four centre coulters of each plot were cut for a distance of ten feet, and corresponding samples were obtained from adjacent "no nitrogen" plots. The following details of these trials are given:—

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(1) TRIAL ON FARM OF J. F. LANGLEY, SOMERTON.

Soil: Flat silty loam.
Prior crop: Wheat.
Variety of wheat in trial: S.S. Tuscan.
Date topdressed: 28/9/38.

Observations: "At laying down, wheat showed obvious signs of nitrogen deficiency. A very definite response to sulphate of ammonia was observed in November and January, and also at harvest. Broken straw was, however, more prevalent on the nitrogen plots, although the wheat was taller and more dense."

(2) TRIAL ON FARM OF W. J. CROZIER, MITCHAM.

Soil: Flat medium silt.
Prior crop: Potatoes.
Variety of wheat in trial: Cross 7.
Date topdressed: 28/9/38.

Observations: "At laying down, wheat showed obvious signs of nitrogen deficiency. A marked response to sulphate of ammonia was observed in October and January, and also at harvest. Broken straw was more prevalent on the nitrogen plots, although wheat on these plots was distinctly taller."

(3) TRIAL ON FARM OF R. J. SUTHERLAND, SPRINGBANK.

Soil: Flat clay loam low in organic matter.
Prior crop: Italian ryegrass.
Variety of wheat in trial: S.S. Tuscan.
Date topdressed: 10/10/38.

Observations: "Crop stunted and yellow at the time of laying down. An outstanding response to sulphate of ammonia was seen in November. This response was still quite noticeable at harvest, and was seen in taller wheat and better developed heads."

(4) TRIAL ON FARM OF J. WYLLIE, OMIHI.

Soil: Flat medium to heavy loam, "tarry" in nature.
Prior crop: Wheat.
Variety of wheat in trial: Cross 7.
Date of topdressing: 6/10/38.

Observations: "Wheat distinctly yellow and backward at the time of laying down. A slight response to sulphate of ammonia was observed in November, while the wheat in the treated plots was slightly later in ripening."

(5) TRIAL ON FARM OF M. BUTCHER, BROADFIELDS.

Soil: Flat medium loam.
Prior crop: Wheat.
Variety of wheat in trial: Cross 7.
Date of topdressing: 8/10/38.

Observations: "When the trial was laid down the crop was yellow and stunted. A marked response to sulphate of ammonia was seen in October and December. At harvest the wheat in the nitrogen plots was taller and the heads better developed."

Results

The following results were obtained after threshing:—

TRIAL	YIELD IN BUSHELS, PER ACRE.		
	No nitrogen	Sulphate of ammonia	Difference in favour of sulp. of ammonia
(1) J. F. Langley	21.3	27.1	5.8 S.
(2) W. J. Crozier	14.1	18.7	4.6 S.
(3) R. J. Sutherland	13.2	17.6	4.4 S.
(4) J. Wyllie	25.3	29.2	3.9 N.S.
(5) M. Butcher	23.4	27.7	4.3 S.
Average 5 crops	19.4	24.0	4.6

A point that should be noted about the above trials is the low average yield of both the treated and untreated plots. Four out of the five experiments show significant increases. With wheat at its present price a three-bushel increase would cover the cost and application of the sulphate of ammonia used. The four significant increases will therefore show a profit on the outlay ranging from approximately 7s to 15s per acre. It should be remembered, however, that the season favoured maximum responses.

Because of the dry conditions following topdressing of the trials in the 1937-38 season it is of interest to compare the results with those of the past season. Although the average increase (5.9 bushels per acre) for the five experiments in 1937-38 was a good deal higher, the results of individual trials showed greater variation, and ranged from 1.4 bushels to 11.0 bushels, while only two out of the five trials gave significant increases. In view of this and the fact that dry seasons in the past have resulted in smaller increases, further trials as opportunity is presented appear to be warranted.

The thanks of the Department are extended to those farmers who co-operated in the experiments during the past season.

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FOR CLEANSING COWS AFTER CALVING.
FOR HEALTHY HERDS
AVOID BAD CLEANSING AT CALVING TIME
1/6 PKT.
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Hundreds have Proved it - Endorsed it - Carried it out
HAVE YOU?
INSIST ON SYKES'S

Pedigree Sow Records

Contributed by the LIVESTOCK DIVISION.

OF the 80 sows recorded for the quarter ended August 31, 1939, 51 had litters sufficiently good to be included in one of the five grades set out below:—

Grade	Litter Weight	
	At 3 weeks	At 8 weeks
1	120 lb.	360 lb.
2	100 lb.	300 lb.
3	90 lb.	270 lb.
4	80 lb.	240 lb.
5	70 lb.	210 lb.

THE following table sets out the performance of each breed as an average for all sows recorded during the quarter:—

Averages.

Breed.	No. of Sows.	No. of Pigs per Litter.		Litter Weight at		Weight per Piglet.	
		Born.	Weaned.	3 Weeks.	8 Weeks.	3 Weeks.	8 Weeks.
Berkshire ..	22	8.5	7.3	88	228	11.9	31.3
Large Black ..	9	9.1	6.4	77	204	11.5	31.6
Large White ..	8	11.6	9.0	104	330	11.1	36.6
Tamworth ..	41	8.7	6.9	81	249	11.6	36.3

In the following list the owner's name and address are given, followed by the herd book number of the sow, the weights at three and eight weeks, the numbers of pigs born and weaned, and the grade of the litter.

Berkshires.

Owner's Name and Address.	Herd Book No. of Sow	Litter Weight (lb.)		No. of Pigs		Grade
		3 weeks	8 weeks	Born	Weaned	
J. F. Barnaby, Rongotea	10718	84	222	12	7	5
	11579	105	257	12	8	4
	11143	94	236	14	8	5
	14180	44	128	8	5	—
Bulls Pig Club, c/o. R. H. Grey, Parewanui Rd. Bulls	13828	118	278	9	9	3
T. K. Butler, Karapiro R.D., Cambridge	13124	70	195	6	6	—
Canterbury Agricultural College, Christchurch	12816	59	184	4	4	—
Fordell Pig Club, c/o. A. P. Melville, Ranagour, Fordell	12386	132	350	7	7	2
Hicks Bay Pig Club, c/o. L. T. Hughes, Hicks Bay ..	12622	122	325	9	8	2
L. T. Hughes, Hicks Bay	13794	50	147	6	6	—
Kaingaroa Pig Club, c/o. G. A. Morphett, R.D., Kaitaia	13995	90	283	11	11	3
W. Kirkland, Elm Grove, Mosgiel	13180	103	235	8	8	5
Manutuke Pig Club, c/o. R. K. Hepburn, Manutuke, via Gisborne	13606	103	216	8	8	5
Maramarua Pig Club, c/o. S. G. Holloway, Maramarua	13048	67	145	6	5	—
Matakana Pig Club, c/o. J. Wilson, Takatu Pt., W'garei.	12793	81	221	9	8	5
McGill & Son, Ngahape R.M., Te Kawa	11875	74	199	10	8	—
Morrison's Bush Pig Club, c/o. A. Maidment, Greytown	14020	63	160	6	5	—
Ohau Pig Club, c/o. W. R. B. Evans, Buller Rd., Levin	13207	110	273	10	9	3
Otorohanga Pig Club, c/o. Box 6, Otorohanga	13371	59	192	6	5	—
Takaka Pig Club, c/o. W. E. Jenkins, Box 28, Takaka	14450	60	147	8	7	—
Te Kowhai Pig Club, c/o. A. R. Gifford, R.D., Frankton	12939	83	227	9	8	4
S. Unwin, Stoneycroft, Winchester	10387	123	391	10	10	1

Large Blacks.

Mrs. R. A. Boland, Crystal Brook, Longford, Nelson ..	2032	44	118	8	5	—
	2034	45	75	6	4	—
	640	55	117	12	4	—
Hall & Sons, Kio Kio R.D., Otorohanga	1261	64	207	12	6	—
McGill & Sons, Ngahape R.D., Te Kawa	1763	86	253	10	7	4
C. R. McCutcheon, River Rd., Rangiriri	1656	104	265	7	7	4
Nuhaka Pig Club, c/o. D. A. Hughes, Wairoa, H.B. ..	1845	72	203	7	7	—
N. P. Pederson, Kauwhata P.O., Palmerston North ..	1509	120	285	10	10	3
Tahuna Pig Club, c/o. F. B. Whitechurch, Morrinsville	1721	101	310	10	8	2

Large Whites.

Barrytown Pig Club, c/o. A. T. Richards, Barrytown ..	4874	103	347	15	10	2
B. E. Keiller, P.O. Box 272, Palmerston North	5000	70	212	9	7	5
	Utility Lady Bacon	114	384	11	9	2
Kereone Pig Club, c/o. E. Topham, Kereone, Morrinsville	4855	129	344	16	11	2
N. Myers, Mauriceville East	5065	116	411	13	9	2
Mosley Bros., Stirling	5067	68	201	7	6	—
T. E. Rowlands, Kaiapoi R.M.	4814	102	279	8	7	3
Te Puke Pig Club, c/o. K. Bowen, Te Puke	4958	131	460	14	13	1

Tamworths.

Bulls Pig Club, c/o. R. H. Grey, Parewanui Rd., Bulls	10453	55	190	5	5	—
Canterbury Agricultural College, P.B., Christchurch ..	9730	89	260	6	6	4
W. R. Christie, "Blair Athol," Balclutha	8955	76	243	4	4	5
Clutha Pig Club, c/o. W. R. Christie, "Blair Athol," Balclutha	10318	92	282	7	7	3
Coromandel Pig Club, c/o. K. A. McNeil, Coromandel ..	10732	92	254	9	7	4

Tamworths—(continued).

Owner's Name and Address.	Herd Book No. of Sow	Litter Weight (lb.)		No. of Pigs		Grade
		3 weeks	8 weeks	Born	Weaned	
G. L. Donald, Tolago Bay	9326	103	373	13	10	2
Feilding Pig Club, c/o. R. N. Watson, Feilding H.S.	10046	99	329	9	9	3
Frasertown Pig Club, c/o. F. Shaw, Box 92, Wairoa	9767	88	213	9	7	5
J. A. Gulliver, Te Puke R.D.	10124	81	221	7	6	5
Hari Hari Pig Club. c/o. P. J. Lucas, Hari Hari, S. Westland	10288	67	188	6	5	—
E. J. Hickmott, North Road, Belfast	8295	95	296	8	8	3
Hinuera Pig Club, c/o. A. G. Reid, Hinuera	9378	96	204	13	9	—
Inangahua Pig Club, c/o. J. D. O'Regan, Inangahua Landing	10138	69	226	7	5	—
Koiterangi Pig Club, c/o. F. C. Marshall, Kokatahi R.D., Hokitika	10294	113	290	10	8	3
Kopane Pig Club, c/o. E. C. Whitlock, Kopane R.D., Palmerston North	5625	123	420	13	10	1
Mangatarata Pig Club, c/o. C. E. Raynes, Waitakaruru R.D.	10389	84	283	6	5	4
Maramarua Pig Club, c/o. S. J. Holloway, Maramarua	10054	85	212	7	7	5
Motua Pig Club, c/o. P. A. Osborne, Shannon	10140	116	331	10	9	2
Motukarara Pig Club, c/o. T. M. Wheeler, Motukarara	9854	111	378	10	8	2
Netherton Pig Club, c/o. H. A. Mills, Paeroa	9366	127	261	13	8	4
Ohau Pig Club, c/o. W. R. B. Evans, Buller Rd., Levin	9745	88	244	12	8	4
Okahu Pig Club, c/o. H. E. Addinell, Okahu R.D., Dargaville	5348	82	238	11	7	5
Paengaroa Pig Club, c/o. H. Jones, Te Puke R.D., Bay of Plenty	10179	76	238	10	7	5
Pahiatua Pig Club, c/o. A. J. Gleeson, Box 45, Pahiatua	7859	42	124	4	3	—
Pohangina Pig Club, c/o. T. J. Spelman, Raumai	10142	72	278	10	8	5
Pokeno Pig Club, c/o. K. Munro, Pokeno	10734	76	232	8	7	5
Puhoi Pig Club, c/o. C. A. Straka, Waiwera	9892	112	285	11	9	3
Pukekohe East Pig Club, c/o. T. E. Morgan, Pukekohe E.	10268	67	288	7	7	—
Pukekawa Pig Club, c/o. J. D. Lindberg, Pukekawa	10055	62	155	5	5	—
A. & J. Rainey, Flaxton, North Canterbury	10053	120	468	11	9	1
Riwaka Pig Club, c/o. O. C. Wilkinson, Motueka	10295	70	281	9	8	5
Ruakaka Pig Club, c/o. J. C. Sandford, Ruakaka	10432	30	97	6	4	—
M. D. Studholme, Te Waimate, Waimate	10761	90	295	10	10	3
	10762	44	154	4	4	—
Tatarariki Pig Club, c/o. J. L. Bassett, Tatarariki, Dargaville	10433	18	82	4	4	—
Te Araroa Pig Club, c/o. W. M. Halliwell, Whakaangiangi	8968	20	89	10	2	—
Tokomaru Pig Club, c/o. H. J. White, Tokomaru	9744	100	324	10	9	2
Waihi Pig Club, c/o. A. C. Davidson, Tauranga Rd., Waihi	10733	55	160	10	6	—
Western Drain Pig Club, c/o. J. E. Musset, Box 12, Whakatane	9813	60	262	16	9	—
Whakawhitira Pig Club, c/o. H. Fox, Ruatoria, Est. Cst.	8971	90	273	7	6	3
Whatatutu Pig Club, c/o. D. W. Anderson, Whatatutu, Gisborne	9037	70	191	11	6	—

Treating Stack Covers

W.P. (SOUTHLAND):—

In recent issues of your "Journal" mention has been made of the "bluestone" method of treating stack covers, and I have been wondering if the same preservative action would take place if this solution were applied to wood. Do you think it would have any action in preventing the white pine borer if applied by a sprayer to wooden buildings, especially on the interiors? I understand that, applied externally, the action of rain and weather would probably wash the solution out in time, but perhaps a coat of paint may prevent this, provided the solution had no bad effects on the paint. If it can be used for the above purposes it would appear to be a very effective and economical way of dealing with these pests.

Many theories are extant regarding the death-dealing causes of ragwort, but I think it is generally accepted that the lethal qualities are due to the accumulative action of some poison in the plant. Could you tell me what this poison is, and have the percentages of poison to plant by weight been ascertained?

FIELDS DIVISION:—

The method of treating stack covers with bluestone described in recent issues of the "Journal" is specifically intended to control the growth of moulds on the canvas. It is not considered that the similar treatment applied to wood will have any effect in controlling the white pine borer.

The poisonous properties of ragwort are due to the presence of an alkaloid known as "jacobine" in the plant. The percentages of this substance have been determined in ragwort from various districts, but the amount varies considerably according to soil type, stage of growth, and time of the year. The alkaloid content ranges from about 0.06 per cent. to 0.3 per cent. according to the condition and location of the plant.

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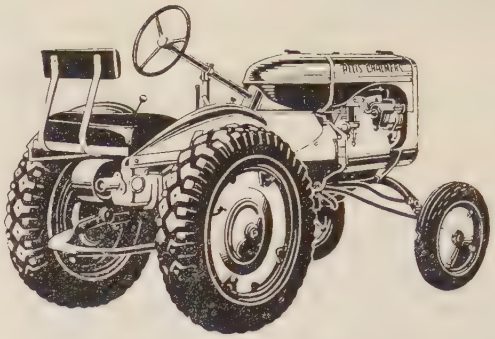

To-day everyone is agreed that one of the greatest contributions New Zealand can make in the present situation is to increase farm production. Britain needs food—as much as we can produce, and here is the way to increase production on your farm without relying on labour which may not be available.

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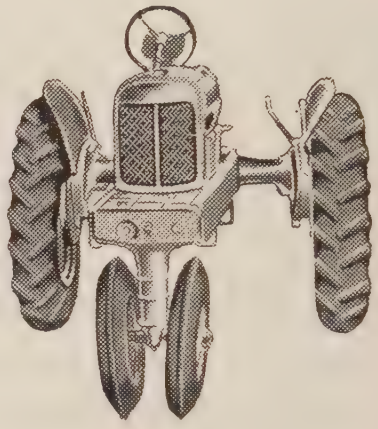

We particularly recommend these two from the Allis-Chalmers range because they meet the needs of the small to medium farm. Each is a mighty tough Tractor . . . fast, compact, and so easy to handle a schoolboy could drive it all day long. Each is low in first cost and a real fuel miser (an important point in view of the oil situation). Each can handle every farm power job from ploughing to harvesting, and each is a thoroughly reliable and modern unit built by the Company which pioneered all farm tractor development. Send off the coupon . . . get the facts about these two beauties. Make an investment in modern power and help yourself, help New Zealand, help Britain!

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Light as a feather to handle, but does comfortably the work of five horses. Four forward speeds to conquer any going at pace. All Allis-Chalmers exclusive advancements—removable cylinder sleeves and valve guides; fuel, air and oil filters, waterproof magneto, rear-wheel brakes, belt pulley, draw-bar, etc. Reaps, cultivates, sows, harrows. The ideal investment for farms of 50 to 200 acres and to handle the smaller jobs on larger farms. Call, write or telephone for a demonstration.

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Veterinary Notes for the Farmer

Discussions on First-Aid Measures

Contributed by the Livestock Division

Methods of Administering Medicines To Livestock

THE most common method of administering fluids to livestock is by the mouth from a bottle. If many animals are to be drenched it is advisable to have the bottle cased in leather, as this may prevent an animal having its mouth badly cut by broken glass. It may also prevent the loss of a bottle if the patient becomes unruly.

In drenching a cow the operator should stand on the right side of the cow with his left arm over the nose and the left hand firmly grasping the upper lip. He should then insert the neck of the bottle half-way into the right side of the mouth and allow the fluid to run on to the middle of the tongue. The head should be raised slightly above the horizontal to assist the passage of the drench to the pharynx. If the animal should attempt to cough, the head should be released temporarily. The fluid should be allowed to flow slowly from the bottle until swallowing takes place.

Assistance

If the animal is very restive an assistant may help to steady the head by holding the horns, but the animal's breathing should not be interfered with during the operation. When a horse has to be drenched a loop of thin rope is run under the nose-band of the halter into the mouth. The end of the rope is thrown over a beam and the lips drawn out of the loop to prevent injury. If available, a drenching bit may be used. As the drenching of a horse is not generally favoured, medicines are given to horses more commonly as balls, boluses, capsules, and electuaries.

The animal should be in a stall or in a corner so that it cannot run backwards. The head is then raised slightly above the horizontal and the fluid slowly poured into the mouth as before. Immediately lower the head if coughing takes place. It is **not** a good plan to rub or tap the throat to induce swallowing. A better method is to push the end of the halter shank back among the molar teeth to induce chewing, which then induces swallowing.

In drenching a pig it is a good plan to place an old shoe in the mouth and pour the fluid into this. The pig will chew on the shoe and, as this has a hole cut in it at the toe, the fluid runs back into the mouth. Fluid can also be poured through a rubber tube or

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hose pipe from a funnel. The hose pipe is placed in the pig's mouth, and the fluid runs into the mouth. The pig usually chews the hose and swallows.

Drenching Sheep.

Sheep are more easily drenched, but it is bad practice to sit the sheep on its haunches. Straddle the sheep at the shoulders, or have it in a narrow race, and lean over the side. The mouth can be opened by the left hand going round the lower jaw with the thumb inserted into the mouth. The use of mechanical dosers is increasing, but many owners do not possess them.

When using the various types of drenching gun on the market at the present time it is necessary to see that the nozzle of the gun does not injure the inside of the sheep's mouth. Many guns are now fitted with protective rubber to prevent injury, or the nozzle is slightly curved and blunt for the same purpose. It is easy to cause severe abscess formation in the gum and cheek if the point of the nozzle injures the lining of the mouth, especially when drenching with solutions containing copper sulphate or other worm medicines.

In drenching a dog the main thing is to see that he does not bite. Apply a clove hitch round the jaws, and tie it at the back of the head. Pull out the angle of the lips, and pour the fluid into the pouch thus formed.

Disposal of Carcasses on the Farm

FROM a sanitary point of view no carcass should be left unburned in the open on the farm. Blowflies breed very freely on such carcasses, and may cause some considerable loss through sheep and lambs getting "blown" and maggotty.

The following is a method of burning a carcass which has been found both simple and cheap where the necessary wood is available.

Two trenches are dug crosswise, each being up to 7ft long, about 15in wide, and 18in deep at the intersection, becoming shallower towards the ends.

The earth dug from the trench is piled at the angles of intersection to provide support for two pieces of railway iron or the chassis of an old motor-car, on which the carcass rests. Fuel is first placed at the intersection of the trench, and the carcass is placed on the top of the frame. A good draught of air comes down the trench, and the carcass can be entirely consumed provided there is an ample supply of fuel in the form of wood or coal.

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The DRENCH is a wonderful help at calving time. In the case of an unthrifty cow, the response is immediate: while the remedy is invaluable for chill, hard quarter, ropey milk, scouring, or kindred ailment.

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Sheep carcasses may be readily disposed of in this way, but the destruction of carcasses of cattle and horses is more difficult because of the very large amount of fuel that is necessary for the complete burning of such a carcass.

Burial will be found more satisfactory in many such cases. The method of disposal, whether by burial or burning, will depend upon the nature of the ground and the availability of a plentiful supply of cheap fuel. From a sanitary and hygienic point of view in regard to the health of animals on the farm, one or other method of disposal should be practised on every farm.

Infection in Horse's Ear

F.W. (WARKWORTH):—

Would you please answer the following questions through the columns of your valuable journal:—

Some years ago one of my farm horses got canker of the ear, and it became so acute that I had to get a veterinarian to lance and attend to it. It was not long before its mate also contracted the same complaint, and this recurred in both horses each summer in both healthy and affected ears, but not so acute, although leaving the ears shrivelled and dead. Now I have lost one of the horses and have replaced it with a new draught horse.

Could I do anything with this horse's ears by way of disinfectants or otherwise to prevent it contracting the canker this coming summer, or what treatment is required when it is first noticeable?

As cattle tick become very prevalent in my district, what is the best method of combating them on horses and dogs? I find several disinfectants are of no avail.

LIVESTOCK DIVISION:—

The condition affecting the ears of your horse does not appear to be any specific disease, but rather the result of infection followed by abscess formation and deformity. The most likely cause of this is biting flies, and any suitable fly repellant used at the time when flies are active should prevent a recurrence of the trouble. One part carbolic acid to 20 parts vaseline, mixed as an ointment, should be all that is required for this purpose.

Re cattle tick, no application is effective against this parasite unless it contains arsenic in its composition. Cooper, McDougall, and Robertson, Ltd., Auckland, make a reliable preparation for this purpose, the instructions for the use of which must be carried out in detail. Where practicable, ticks are best controlled by burning off the paddocks or coarse herbage during the late summer months.

Advisory Service on Veterinary Matters.

Farmers are invited to submit inquiries connected with the health of their stock, and the replies will be published under this heading.

Sucking by Cows

W.H.K. (TAKAKA):—

Last year one of our cows got the habit of sucking other cows, and this spring another one, a two-year heifer this time, has also got into this habit. I am beginning to wonder if this is just a habit due to some sort of a deficiency, and would be grateful if you could tell me your opinion on the matter, through the "Journal's" advisory column.

LIVESTOCK DIVISION:—

This can be regarded purely as a vice or bad habit, and could quite well be acquired by imitation of another cow, as well as by pure accident, during the cow's licking herself while lying. It is very unlikely that any deficiency question is involved.

Preventive measures are not always satisfactory. One of the simplest, usually effective, is the fixing in cow's nose of an ordinary bull ring to which about three further light rings, about 3in diameter, are attached in chain fashion.

Another is the old-fashioned anti-sucking board attached to the nose, as for calves. A third method, quite effective but somewhat cumbersome, is the use of a girth strap and head collar, with a piece of strong light wood (old fork handle) connecting the bottom ring of headstall below jaw, with the girth either at bottom, when the rod passes between forelegs, or at side, when it passes along side of shoulder.

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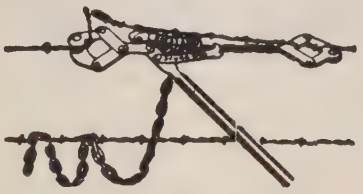

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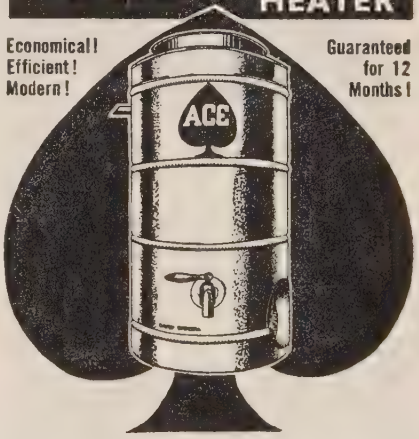

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Contributed by Officers of the Fields Division

Charges for Seed-Testing

AS from December 1, 1939, the services provided by the Department's Seed-Testing Station at Palmerston North, and the fees charged in respect of each service, will be as follows:—

(1) Certificate of analysis: purity and germination 4/-

(2) Certificate of analysis: purity only 2/-

(3) Certificate of analysis: purity and germination—F/D ryegrass, 2/6*

(4) Certificate of analysis, Canadian Seeds Act 1/-**

(5) Certificate: germination only, 2/-

(6) Certificate, per. ryegrass, U.V. examination, preliminary to certification 2/-

(7) Certificate, white clover, picric acid test, preliminary to certification 2/-

(8) Certificate, per. ryegrass—U.V. examination for cert. in commercial class 3/6

(9) Certificate, white clover—picric acid test—for certification ... 3/6

(10) Certificate: Additional copies of Nos. 1, 2, 4 and 5 above ..... 6d.

Comment

Fees as shown on the amended scale above will be charged for certificates issued in respect of all samples received on and after December 1, 1939.

This will necessitate the rendering of two separate debit statements for the month of December—one at the old rate for certificates issued in December on samples received up to November 30, 1939, and one at the amended rate for certificates issued in December on samples received in that month.

*** No. 3. Purity and Germination—F/D ryegrass.**

A new service for samples of farmers' dressed ryegrass only. Hitherto, samples of this description have been tested and reported upon on an "M/D basis," and no charge has been made for the separation of the pure seed used for the germination test. The new certificate will report the approximate percentage of pure seed, a description of the impurity, and the germination capacity of the pure seed, which, as previously, may be accepted as the germination on a dressed basis.

Samples of F/D ryegrass should be plainly marked as such, or they will automatically be tested and reported on under No. 1, with a full purity and germination certificate. This indicates that samples of ryegrass, both perennial and Italian, are now included in the same category as all other grass and clover seeds and accepted for testing for purity and germination or purity only, as prescribed by the international testing rules. No. 5 (germination only) is therefore now provided only for seeds of roots and forage crops, cereals, vegetable and flower seeds.

**** No. 4—Canadian Seeds Act.**

Hitherto, this somewhat extensive analysis has been made without charge, and reported in the form of an endorsement on the standard of purity and germination certificate. As from the date of operation of the new scale, the results of this analysis and the provisional grading will be reported on a separate certificate, suitably cross-referenced to the relative purity and germination certificate.

General

These amended charges have been fixed after full consideration has been given to the cost of providing prompt and reliable testing services, and to the fact that the fees incurred in the testing of any one line are extremely low in relation to the value of the seed commercially, especially as test percentages are utilised largely in assessing that value.

The above charges apply to all samples received at the Station for which certificates are issued. With respect to samples submitted by farmers who require information for the purposes of sowing seed on their own properties, such samples will be reported on by letter, without charge, as formerly.

N. R. FOY, Officer-in-Charge,
Seed-Testing Station, Palmerston N.

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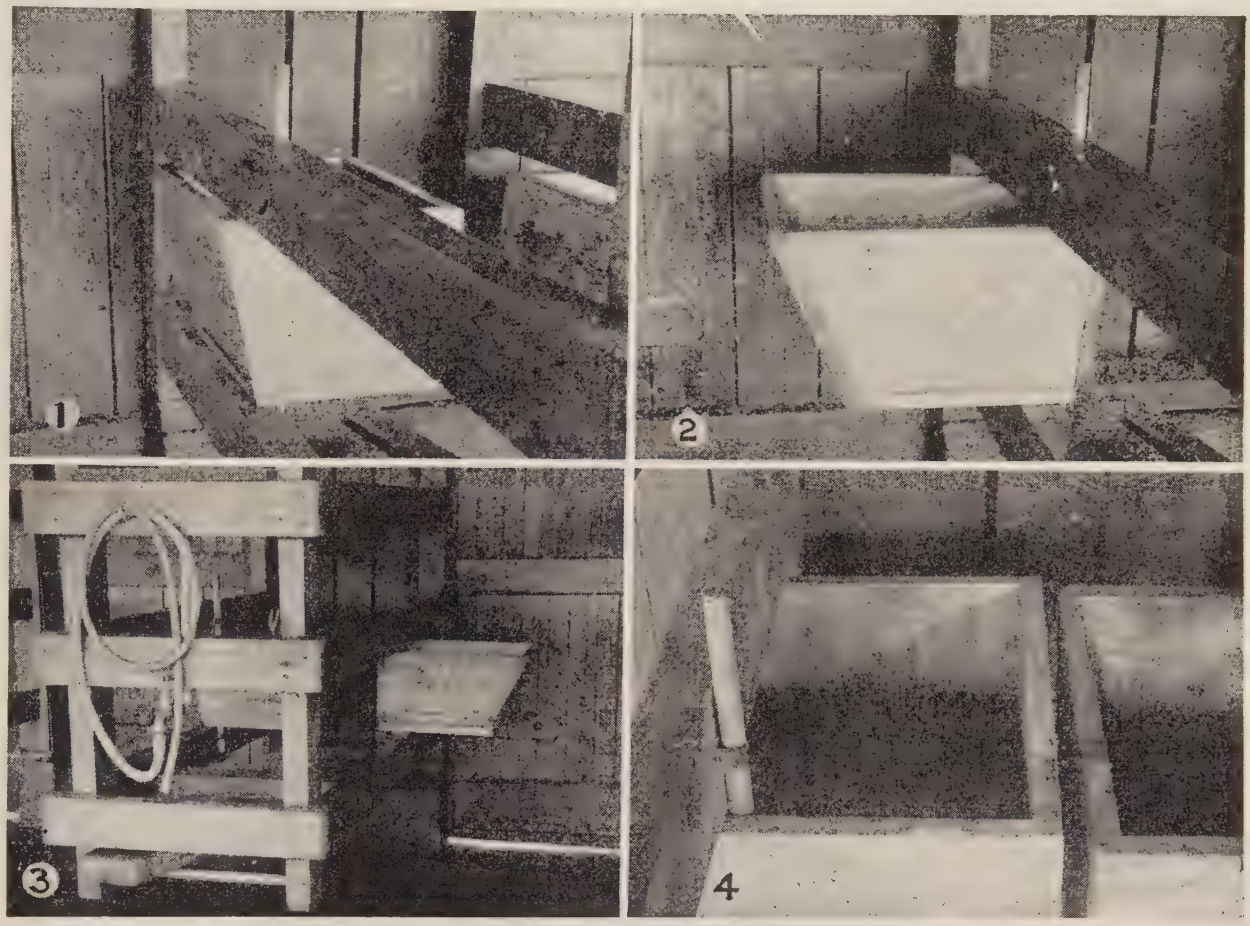
Useful Boxes for Feeding Concentrates To Dairy Cows



FARMERS sometimes feed concentrates to cows during milking, and various types of feed boxes arranged to suit the walk-through cowshed are used. The box described in these notes is used in the dairy cow nutrition shed at the Animal Research Station, Ruakura. It is cheap to construct, and is simple and efficient.

The box illustrated is 15in. x 12in. at the top, and 12in. x 10in. at the bottom (outside measurements), and holds 6lb. of concentrates without any danger of the cows spilling the contents while consuming them. The box is so hinged that, as the cow passes out of the door, she automatically pushes the box back into the dummy and so obviates the chance of breakage (Fig. 1).

The shaping of the box is shown in Fig. 2, which shows the box on the left side of the dummy. The side facing the observer and the free end are sloped outwards at the top to allow easy access in feeding, while the other side and hinged end are perpendicular. The sloping side and end are reversed for the right-hand boxes.

A hole is drilled in the bottom of the box in a corner of the sloping side at the rear end, and a pivot rod made of ½in. piping is passed through and then attached by pipe brackets to the inside of the box and to the two rails of the dummy (Figs. 3 and 4). A small stop block is necessary below the bottom of the rail bracket to prevent the rod dropping through. To detach the box for cleaning all that has to be done is to pull out the pivot rod.

In some sheds it may be found that there is a variation of widths between the two bottom rails of the dummies, in which case the depth of the boxes must be made to the smallest measurement. Hinge the boxes just sufficiently far back from the door end of the dummy to allow for corner clearance, and leave approximately 1in. between the folded-in boxes to prevent fouling as they are being turned out into the bail (see Fig. 4).

—*S. A. SOUTHCOMBE, Livestock Overseer, Ruakura.*

Device For "Mothering" Strange Lambs

A roughly constructed pen showing the ewe and a strange lamb. The pen is so small that it is impossible for the ewe to turn round or lie on the lamb.

MOTHERLESS lambs waste a great deal of the farmer's time, and there are various methods employed to persuade a ewe to take a lamb which is not her own. The skinning of her own dead lamb and fitting the skin as a jacket on the lamb which it is intended that she shall "mother" is probably the most general practice.

A less known practice, but one which gives excellent results, is as follows.

In all paddocks where ewes are lambing one or more small pens are roughly constructed in convenient spots, either in corners or along fence lines. These pens consist of a short length of sheep netting and several wooden stakes or iron standards, and the pen is shaped like a pear and just long enough to hold a ewe and not wide enough for her to turn round.

When, on his rounds, the farmer finds a ewe with a dead lamb, he runs her into one of these pens and looks round for a motherless lamb, an unthrifty twin, or triplet, which he places in the pen with the ewe, and very soon the lamb is sucking away as if the ewe were its own mother. It rarely takes more than 24 hours before the ewe has completely taken to the lamb, and frequently less time is needed.

After 24 hours. Free again and quite reconciled to her adopted lamb.

However, on his rounds the farmer can quite easily detect whether it is safe to release the ewe and lamb by taking the lamb away and if the ewe appears distressed and bleats he will know that the "mothering" is complete.

—R. P. HILL, Fields Instructor, Hastings.

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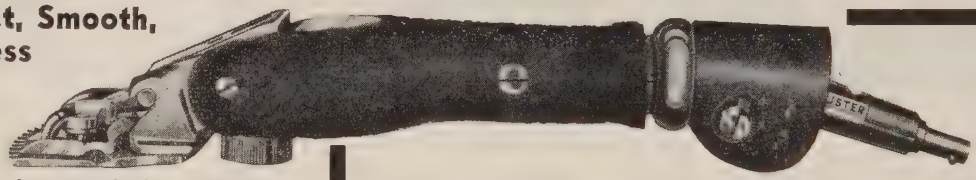

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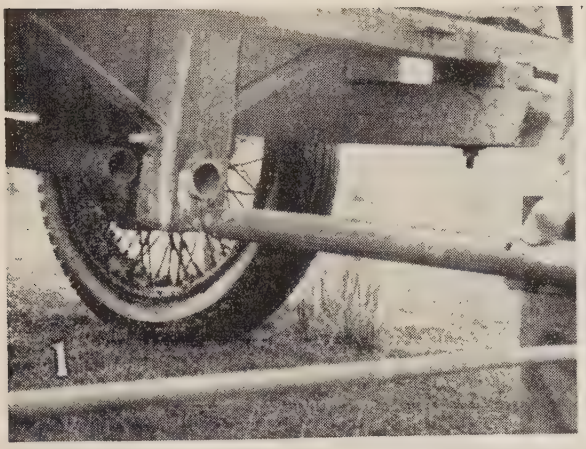

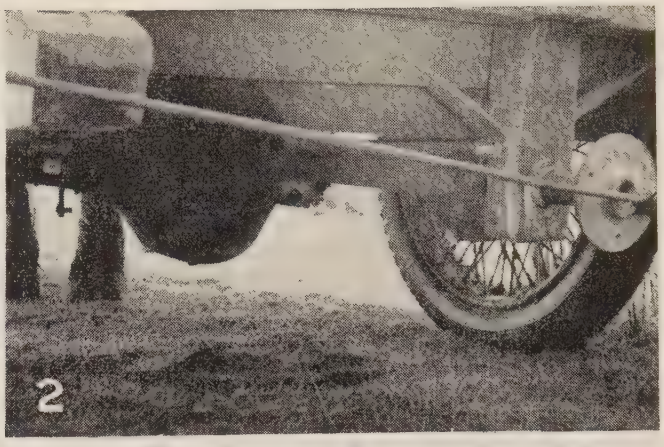

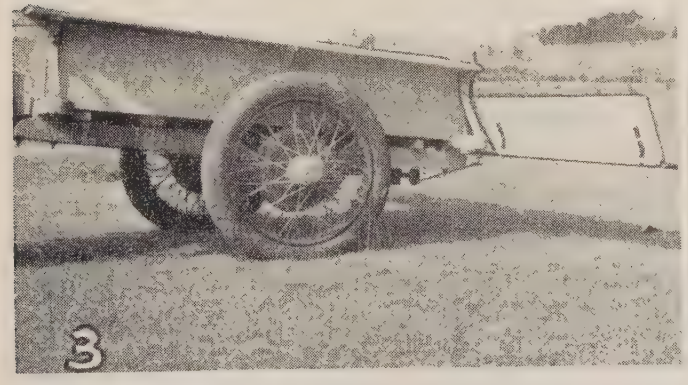

Fig. 1—Coupling up the driving mechanism. Note how the smaller pipe slides through the supporting bracket into the larger pipe, and the hole through which the holding pin is inserted. *Fig. 2*—Showing how the power is connected to the agitating mechanism. Note the flange, the crank-pin and the connecting rod which operates the agitator. *Fig. 3*—Front view of box showing how power is transmitted to the agitating chain. The rod along the bottom of the box is connected at each end of the agitating chain and transmits the reciprocal motion from the crank. *Fig. 4*—The machine in action. The work is so light that it is easily performed by a schoolboy.

IN these difficult and uncertain times, when many farmers are anxiously seeking for ways and means of cutting expenses without at the same time adversely affecting farm production, it may be interesting to learn how one farmer, Mr. D. MacFarlane, Warkworth, has not only contrived to make an appreciable economy, but has succeeded at the same time in greatly improving his labour efficiency.

Breaking in a farm is an expensive undertaking, and like many other farmers on yet undeveloped land, Mr. MacFarlane preferred to consider, not what equipment he would like to buy, but rather what he could manage to avoid buying. He decided to make a topdresser for himself. A careful examination of the accompanying illustrations, together with the following brief description, will show just how far he has succeeded.

Mr. MacFarlane already possessed a light farm dray, the wheels of which were so badly worn as to be in need of renewal, so he decided to kill two birds with one stone. He scrapped the old wheels, and mounted the dray on an old motor-car rear-axle. This gave him a very useful farm dray, running on pneumatic tyres and fitted with ball-bearings, which make it very light in draught. With this cart, one horse can now do almost the work of two.

Construction

The construction of the topdresser itself is extremely simple. The hopper

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is made from 12in. by 1in. by 12ft. boards of seasoned timber, so arranged as to give a width of 16in. at the top and narrowing to 2½in. at the bottom, the bottom edges being rabbeted to accommodate a sliding metal plate 3in. wide by 1-16 of an inch thick and about 1in. shorter than the inside length of the hopper. This plate is bored with a series of 5-8in. holes at 3in. centres, and immediately below it is another plate, similarly bored but 4½in. wide, so that it can be screwed on to the bottom of the hopper. By adjusting the position of the top plate, the holes in the bottom plate can be gradually closed or uncovered to give the required rate of sowing.

The setting is performed by means of a quadrant lever fitted behind the hopper. In boring the plates, great care must be taken to insure that the holes are accurately spaced so as to register exactly; otherwise the machine will sow unevenly, particularly at the lower rates.

The box itself is fitted with two strong iron brackets, so made as to reinforce the woodwork and to slip on to the tailboard pins of the cart.

Agitating Mechanism

The agitating mechanism is simple, but ingenious. An 18in. length of 1¼in. piping with a flange at one end is bolted direct to the flange on the drive shaft. A pin through this pipe engages with corresponding holes in an inserted piece of 1in. pipe, the other end of which is fitted with a flange bored to take a screw which acts as a crank pin. When the cart is in motion the shaft is turned through the differential, and the crank actuates a rod so as to give a reciprocating motion to a length of cow-bail chain or binder chain lying along the regulator plate. This provides a constant feed of fertiliser through the distributing holes in the two plates.

Mr. MacFarlane has found the machine very satisfactory in use. The ball-bearing axle makes for light draught, so that a fair supply of fertiliser can easily be carried in the cart, which also acts as a serviceable feeding platform. Once the cart is loaded the work of feeding the machine is so light that it can with ease be performed by a schoolboy. The distribution of the fertiliser is very even, and the machine can very easily be adjusted to operate over a wide range of sowings per acre.

Cost

Apart from Mr. MacFarlane's own labour, the cost of the machine worked out as follows:—

	£	s.	d.
Timber	0	16	0
Feed regulating plates (bored by local blacksmith)	0	18	0
Rear axle with wheels and tyres	3	0	0
Total	£ 4	14	0

Considering the efficiency of the machine, its ease of operation, and the fact that this cost includes the conversion charges to provide a very serviceable pneumatic-tyred ball-bearing cart, it will be readily agreed that the money has been exceedingly well spent.

—P. S. SYME, Instructor in Agriculture, Warkworth.

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This photograph shows the "Giant" Disc at work on steep hillsides. It has brought in hundreds of acres of virgin land of all classes for its many users. The "Evona Giant" Disc has also proved remarkably effective on blackberry, scrub, ti-tree, tall-fescue, rank paspalum, fern, etc., doing up to 10 acres double cut virgin land in an 8-hour day. The "Evona Giant Chain" Harrow will clean up all rubbish, pull out loose timber, pull down any mounds, and fill up hollows. Work the two implements and you will have virgin land brought into a seed bed of fine even tilth. Note the deep cut when set is applied.

Useful and Cheap Hay Shed

DURING recent years the practice of baling hay has become most popular in many districts. The extra cost, some 12/- to 16/- per ton of baled hay, is offset by the better rationing of the stock and the reduced waste that otherwise would occur. Hay in bales proves exceptionally useful during feeding out in periods of rain and strong winds. Best results are only obtained when good-quality material is harvested and pressed under the most favourable conditions. Poor-quality stemmy growth which is adversely affected by the weather conditions at the time of harvesting is not worth the time and money spent in pressing the hay.

A useful and cheaply built shed for storing baled hay.

It is quite a common sight in some districts to find stacks of baled hay lying out in the fields for many months until used. Sometimes a sack covering is placed over the heap, or else some loose hay is piled on top. Such covering or lack of covering, means that the hay is subject to all unfavourable weather conditions. The hay deteriorates in quality, and may even be rendered useless for feeding stock. Mouldy and half-rotted hay causes many digestive troubles if fed to animals.

If the farmer presses his hay it is also essential that the work be completed and the hay either placed for storage in a suitable weatherproof hay shed or some effective covering placed over the stack of bales. Whether a permanent hay shed is built or some suitable covering is made to enable stacks to be placed at suitable places on the farm depends entirely upon the circumstances on the particular farm.

Some farmers utilise removable roofs of corrugated iron, built in sections. These prove quite successful if precautions are taken to ensure that the roof is well fastened down, so that strong winds do not lift the iron sections off the stack. The accompanying photograph illustrates a hay shed capable of holding some 27 tons of baled hay. This shed, which was cheaply constructed, was placed in a central position on the farm, and fulfils its function admirably.

The shed is 30ft. by 15ft. overall, has six studs or posts, and is 12ft. 6in. to the eaves. On the side of the prevailing wind, not shown in the photograph, the iron is brought half-way down the side. It will be also noticed that gutters, with accompanying downpipes, have been placed on the shed. When this shed was first built these were not included, but after loss through dripping water during the first season these were found necessary.

If, on the score of expense, it is not possible to carry the iron down on the weather side, useful protection could be obtained by making a screen or wall of old manure bags. If these were thoroughly soaked in a 5 per cent. solution of copper sulphate (bluestone) they would last at least two seasons.

—E. H. ARNOLD, Instructor in Agriculture, Dargaville.

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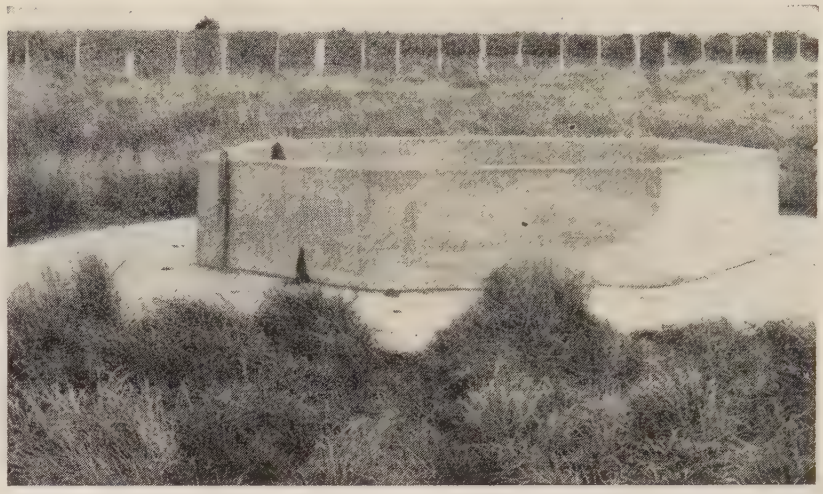
Novel Watering Trough for Cattle

A NOVEL watering trough for cattle is to be seen on the farm of Mr. H. J. Riddle, Thornbury. This farmer, who milks a herd of pedigree Ayrshire cows, had often noticed that one or two cows practically monopolised a trough, especially in hot weather, by remaining at the trough and swinging their heads at other thirsty animals.

To minimise this difficulty Mr. Riddle has constructed a seven-sided trough, so that seven animals have access simultaneously. The only disadvantage is that the trough serves only one paddock, but this is more than compensated for by the larger number of animals able to satisfy their thirst.

In the accompanying photograph the trough is seen as yet incomplete, for at the top left a ball-cock has to be affixed, which will be protected from the cattle by a board sitting on the trough. Provision for draining the trough has been made.



The seven-sided watering trough described in this article.
[S. H. Saxby, photo.

Another novel feature is the construction of a concrete platform around the trough to minimise the wear which always takes place and which otherwise demands frequent filling with gravel.

—A. STUART, Instructor in Agriculture, Invercargill.

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Simple Device for Trimming High Hedges

A NOVEL method of trimming off the side branches of a shelter belt up to a height of 24 feet was seen recently on the property of Mr. James Carr, Highbank.

Some years ago the trees, *pinus radiata,* were topped and the lower branches trimmed off with a mechanical hedge cutter. Since then the side branches have developed, and, spreading across the drive, they were becoming a potential danger through contact with the power lines on the other side.

To trim off these side branches, an 18ft. ladder was secured to an ordinary farm dray with frame attached by placing the ladder at an angle through the back of the frame, with one rung resting on the floor plate of the dray and fastened securely with rope or wire.

An extra safeguard was provided by two ropes attached about 4ft. from the top of the ladder and running to the front corners of the frame. In addition to providing extra support, the ropes checked side sway. Two sacks of oats were placed on the front of the frame to act as a counterweight.

With one man to lead the horse and another to stand on the ladder and wield the gorse knife, the trees were trimmed quickly and efficiently.

—R. INCH, Fields Instructor, Ashburton.

Suitable Stock-Proof Hedges for Wet Country

SUITABLE stock-proof hedges for country which is inclined to be wet are described by the Fields Division in reply to a correspondent, W.H.M. (Bulls). The Fields Division states:

Acacia verticillata, a spring evergreen, does well on fairly stiff country, and some good hedges of this species are to be seen on the heavier soils along the Wanganui coastal area.

Osage orange (*Maclura aurantiaca*), a thorny deciduous plant, has proved hardy in fairly exposed positions, and will afford a stock-proof hedge similar in type to that of hawthorne if planted close (six inches apart), and the top trimmed back in winter during the initial year of establishment in order to obtain good lateral growth.

Other stock-proof species which succeed in coastal districts include the well-known African boxthorne and *Hakea Saligna,* though the former is best suited by well-drained soils, and the prolific spread of its growth and poisonous nature of the strong thorns necessitate regular attention in trimming and the careful burning of all trimmings. Plants of this species should be planted 12in apart in the rows.

Hakea Saligna

Hakea Saligna thrives well on the heavy, wet, clay soils of the northern districts, and will afford a good stock-proof hedge on land that is inclined to lie wet in the winter. For this purpose plants are usually spaced two to three feet apart in the row.

There are several other well-known species, such as *Cupressus Lawsoniana,* or *C. Benthamii,* on wetter soils which are excellent hedging plants, and which do not give trouble from thorns becoming entangled in the wool of sheep, as do the thorny species. However, with such species it is essential that they be protected from stock at all times if their efficiency as a shelter hedge is to remain unimpaired.

Of the above species, *Acacia verticellata* may be recommended to give satisfaction for your purposes, and while more reliable results are best obtained when protection from stock is offered, particularly during the early stages, it would be quite possible to establish this species without resort to double fencing. Prepare the ground by digging a spade-width strip along the fence line, and, if possible, work in organic manure. A mixture of artificial fertilisers, such as superphosphate and blood and bone, would also prove beneficial to establishment.

Preparing the Ground

The ground is best prepared some time prior to planting, particularly if the field is to be stocked soon after that date, as newly-turned soil has a special attraction for stock which, in the course of their investigations, would be liable to damage or destroy the young plants.

Planting of this species is best deferred until late August or September in order to avoid frosts in the initial stages of establishment. Space the plants 12 to 18 inches apart along the bottom wire of the fence, and make sure that the roots of the plants do not dry out prior to planting and that the soil is firm around them after planting. Also ensure that no smothering growth affects them until they are strongly established and able to take care of themselves in this respect.

Plants of this species should afford a good cattle-proof hedge within two or three years after planting, and only light trimming should be necessary to keep them in order.

Horticultural Instruction

Contributed by Officers of the Horticulture Division

Orchard Notes

Control of Pests and Diseases

BY the time these notes are published the blossoming of most apple and pear varieties will be just passed and a new phase in the disease control measures for apples and pears will begin. Up to this point only a single spray material has been necessary at one application—first, an insecticide to destroy scale insects and red mite eggs, and later, a fungicide as a foundation spray in the programme for black spot and powdery mildew control.

Now a new phase in spraying begins, necessitating the use of several materials which may be used in combination to control both insect pests and fungous diseases. Particular care is required in the choice of materials and the strength of application, especially in combining materials, because, at the petal-fall period which is now being discussed, fruit is very susceptible to injury. The choice of material must be made with due regard to the susceptibility of the variety to any particular disease, its liability to russetting, and the condition of the trees.

Spraying of Apples

An outline of the general spraying programme was given in last month's notes. It is necessary to amplify somewhat in giving a direction as to choice of materials in different circumstances.

For most apple varieties under average conditions lime-sulphur 1-150 plus 2lb colloidal-sulphur per 100 gallons is the most effective fungicide for summer use. It is more effective than either material used alone, and is less damaging than lime-sulphur without colloidal-sulphur. The combination has the further advantage of keeping red mite in check during the early summer period, thus often delaying an attack sufficiently heavy to necessitate the use of a summer oil until a later period, when such may be applied with greater safety through the possibility then of keeping the trees free of sulphur sprays, a necessary condition when applying a summer oil.

In the case of varieties such as Cox's Orange and Dunns, which are tender-foliaged and susceptible to russetting, it is advisable to delete lime-sulphur altogether as a summer spray and to use only colloidal-sulphur as a fungicide, starting with the petal-fall application. The same would apply to trees in a weakened condition or carrying an excessively heavy crop. It may be found necessary to follow this course with Sturmers at an early period.

In northern districts codling moth is usually active by petal-fall. This necessitates the introduction of arsenate of lead into the spray mixture at this early period. In other districts it has been the practice to use a fungicide only at petal-fall and to introduce the arsenate of lead into the next spray 10 days later.

Avoiding Spray Injury

When lime-sulphur and arsenate of lead are combined injury sometimes occurs through the increase in water-soluble arsenic. The trouble occurs where spraying water shows a high degree of temporary hardness, as in the artesian water used for spraying in Hawke's Bay. Water in other fruit-growing districts shows a certain degree of hardness, although not to the same extent, but sufficient to be of some danger.

By mixing hydrated lime at the rate of 3lb to every 1½lb of arsenate of lead the water-soluble arsenate is reduced to a safe percentage.

It is necessary to use hydrated lime with all arsenate applications, but especially when used in combination with lime-sulphur. In a Bordeaux mixture and arsenic of lead combination there is, of course, an excess of lime sufficient for the purpose, and no addition is necessary.

Apple Leaf-Hopper

Apple leaf-hopper has proved a very serious pest in dry seasons and, if uncontrolled, can cause almost as much damage to foliage as red mite. In addition, it badly marks the fruit with excreta. The pest is likely to make its appearance any time after the trees have come into leaf.

Nicotine sulphate, 1-800, which may be added to the other materials used, will effectively deal with this destructive pest if applied while the hopper is still in the nymph stage, but it is difficult to control once it becomes winged. Nicotine, to be fully effective, should be applied on a calm, warm day.

Spraying of Pears

Many pears are spoiled in appearance through the excessive use of Bordeaux mixture, most of the damage occurring at petal-fall and up to three weeks later. The continued use of Bordeaux causes a roughening of the skin of the fruit which rather detracts from the general appearance.

If the initial sprays are thoroughly applied blackspot should be so satisfactorily controlled as to allow for the use of sprays recommended for apples

as a general summer treatment. On no account should Bordeaux be used on a variety such as Winter Cole after "tight-cluster."

However, on such varieties as Winter Nelis grown in humid climates, and in instances where complete control has not been secured by the initial applications, Bordeaux mixture 3-4-50 may be required for several applications.

Spraying Stone Fruit

For the control of brown rot and leaf rust, peaches and nectarines require spraying with lime-sulphur 1-200 plus colloidal-sulphur 2lb. to 100 at intervals of three to four weeks almost up to the time of maturing. Through the withholding of sulphur sprays leaf-rust is sometimes allowed to develop to such an extent that serious defoliation is caused, resulting in a reduction in fruit size, in addition to marking the fruit and reducing it in value. Sulphur sprays should not be applied to peach and nectarine trees if rain is threatening, as defoliation is known to occur when rain follows immediately after spraying.

Black aphis often becomes a serious pest on Japanese plums during November unless trees have been sprayed with winter oil during dormancy. When the colonies of aphis are observed trees should be sprayed with summer oil 1-100, concentrating the spray on the colonies as much as possible.

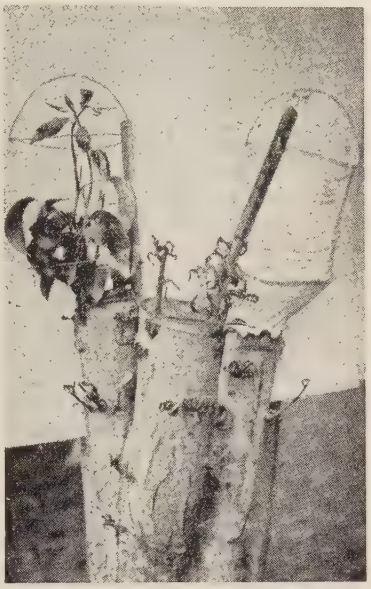
Cultivation

Land previously ploughed should be worked down to a good tilth by now to conserve moisture. Poor cultivation or lack of cultivation is soon reflected in a weakened tone of foliage, and in such circumstances spray injury to foliage readily occurs, further weakening an already impoverished tree. Fruit russetting will become more pronounced, and the crop will be reduced in bulk and will suffer in quality.

Cultivation should be close to the trees, and should be completed by hand-cleaning around trees. Clean cultivation throughout reduces such pests as bronze beetle and pear midge.

Attention to Grafts

Newly-planted trees will require some attention during November. A few well-spaced shoots should be selected to form a good head, and other shoots lower down the stem should be rubbed off. Scions on newly-grafted trees will be swelling, and any



Left.—A simple frame construction around a protected scion with the covering removed. *Right.*—A covered scion. Note the cheese cloth drawn together at the base and tied to the stock. *Centre.*—An unprotected scion showing midge injury.

ties will require cutting, as injury may be caused by the tying material cutting in. Before scion growths become too long they may require protection from wind damage. It is a good plan to tie the new shoots to light stakes, which may be nailed on to the stocks.

It is difficult at times to secure good growth from pear grafts through the ravages of pear midge. Scion growths require protection for a short period in early summer by covering with cheese-cloth bags carried over a light wire frame. By the middle of November the coverings may be removed. Unless protected in some manner pear grafts may be totally destroyed, and in most cases results are very disappointing.

Frost Protection

Frost protection by orchard heating has become a regular orchard practice in certain districts subject to late frosts. The question whether the capital expense for orchard heating is warranted must be determined for each orchard, and can best be determined by the owner studying his own problem and estimating to what extent and how frequently his orchard is liable to suffer a definite fruit loss through frost.

If damaging frosts occur so frequently that repeated heatings are necessary it may prove that fruit-growing is not profitable and should be abandoned. Again, if damage is experienced only at intervals and is then confined to limited areas, extensive orchard heating would not be considered. It may be possible in such circumstances to change over to a variety or kind of fruit less liable to injury, that is, to change from an early blossoming stone fruit to a later-blossoming apple.

—N. J. ADAMSON, District Supervisor, Nelson.

Viticulture

Green Grafting of the Grape Vine

A METHOD of herbaceous grafting of grape vines introduced by Dalmatian settlers into New Zealand a few years ago is giving very good results in the North Auckland district, and promises to increase in popularity among the vignerons. It differs from the Allies, Condurso, and Horvath green grafting methods, resembling more closely that proposed by Hortoles in the "Revue Horticole" for August, 1876, and recommended by H. Goethe in Austria about the same period. It is not unusual in New Zealand for practised vignerons to obtain 95 to 100 per cent. of perfect unions by this method, and the writer is informed that all other methods of grafting vines have been abandoned in its favour in Dalmatia.

Advantages

The advantage of this method over the cleft and whip and tongue methods are a more perfect union and much stronger growth from the scion. There is also the elimination of drying out during the first season after removal from the nursery into permanent position, no mounding up or cutting

out of roots arising from the scion wood or union being necessary. A most important advantage is the immunity of the green grafted vine from Crown Gall or cancer of the vine, or Broussin as the French vignerons call it, which is caused, according to Smith and Townsend, by a soil bacteria *Bacterium Tumifaciens*, which is fairly common in nurseries.

It is usual when employing the method in field grafting to plant the stock cuttings in permanent positions and the scion wood in the row halfway between the stocks. The grafting is usually performed when the rootlings are in their second leaf, weak vines a season later, and misses can be worked with a "Yema" or bud graft, which it is hoped to describe in a later article. When the grafted vines have grown sufficiently to fill all the space in the row the ungrafted vines are uprooted, having produced one or two crops of grapes (if they are of an early-bearing variety) and furnished scion wood for grafting.

Method Described

Following are a few notes gathered in the field by the writer with the object of assisting beginners in the execution of this method of green grafting.

(1) The graft, which is a simple splice or whip graft without a tongue, is executed when the vines are in flower, which is in November and December in New Zealand.

(2) The scion and stock should be of the same thickness and quite green (not turning yellow) and tough enough to withstand bending without snapping. On being cut, no sign of lignification in the form of a whitish ring should be visible.

(3) The scion consists of two nodes and two inches of internode below the bottom node.

(4) The accompanying sketch illustrates the method. To prepare the scion a cut (a) is made from below the top bud in a slanting direction upwards, so as to cut out the bud completely and leave the diaphragm intact. The second cut (b) is made from the same side of the scion as the top cut, beginning 2in. below the bottom node at an angle of approximately 30 degrees.

(5) The stock is cut upwards from about 2in. above the third or fourth bud, preferably so that the bud below the cut will be on the opposite side of the stock to that on the scion, but always so that the bud on the scion points upwards when grafted.

(6) The cut surfaces of the scion and stock at their point of contact should be of equal length and breadth and as short as consistent with the binding of a close-fitting firm union. Cut surfaces of an angle of approximately 30 degrees fulfil these requirements.

(7) The leaves are trimmed off the scions and allowed to remain on the stocks; all sublaterals are broken out.

(8) Suitably developed shoots ¼in. or more in diameter are generally available on average soils when rootlings are in their second leaf, when two or more shoots of the stocks, according to its vigour, can be grafted and the surplus cut out. Experts usually graft only one shoot.

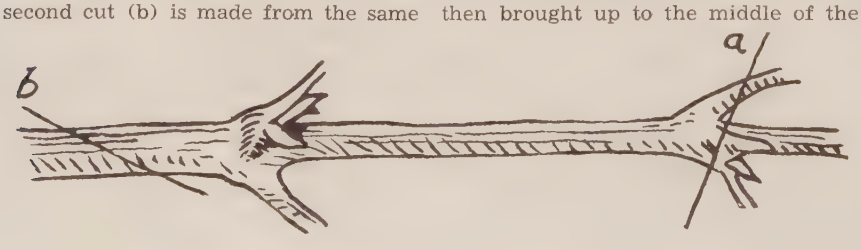
(9) In working over old vines, green shoots growing from spurs left at the previous pruning for the purpose, or suitably placed water shoots, can be grafted. Cropping is continued on the mature vines while they are being worked, so that no loss is sustained.

(10) Green shoots from which scions are intended to be cut are gathered as required and kept fresh in a piece of damp cloth or sacking, and the scions are cut from them as each graft is made.

(11) The best results can be obtained by grafting in the early morning or in the evening. On dull days good results can be obtained all day long.

Binding

(12) Thin rubber ribbon 3-16th of an inch in width and very resilient is used for the binding, which is started in the middle of the union with a half-hitch and wound tightly round the union, working downwards to a quarter of an inch below the union. It is then brought up to the middle of the union and wound round up to a quarter of an inch above the union, where it is secured with another half-hitch. The coils of the binding should overlap slightly, so as to keep out the air and keep in the sap. A cigarette paper is wrapped round the binding and gummed in place to protect it from the sun, or a vine leaf may be tied round it.



When the flow of sap is strong it is frequently seen oozing from the top of the scion two or three hours after the operation is completed, and if the scion does not shrivel after three or four days a satisfactory union is assured. The rubber binding usually perishes in time, but if not it should be cut off as soon as the union is callused or if there is any sign of strangulation. The shoots growing from the scions should be attached to supports to safeguard them from the effects of strong winds.

The most suitable knives for this and other methods of grafting vines are bevelled on one side of the blade only, like Wostenholm's grafting knife, and should have a razor edge kept keen with the aid of a portable stiff strop or razor hone. A razor blade can also be used.

A few vignerons are of the opinion that scions showing slight signs of lignification in the form of a faint white ring when cut may be used with success, but that this should not be visible in the stock.

—J. C. WOODFIN, Vine and Wine Instructor, Te Kauwhata.

Home Gardening

SUBSCRIBER (CHRISTCHURCH):—

Would you mind helping with the following questions:—

(1) Could you advise the best method of preventing the spread of macrocarpa roots into a garden? If a trench is dug could it be treated with anything, such as salt or sodium chlorate?

(2) Is it possible to construct concrete slabs for garden borders, say 12ft long and 6in. x 1in.? If so, what mixture and reinforcement would be required?

(3) For the setting of fruit or tomatoes under glass, what is the correct humidity? Is there a maximum and minimum if a hydrodeik is used? What would be a guide without an instrument; also the temperature in relation to the humidity?

HORTICULTURE DIVISION:—

(1) The best method of preventing the encroachment of the roots of macrocarpa trees into a garden is to dig a trench along each of the boundaries threatened. A narrow trench about 2ft. deep will probably serve the purpose very well. The use of salt or chemical would very probably kill the trees. Unless the trenches are of a great length, they may be filled in after cutting and recut every few years.

(2) The suggestion to make "reinforced concrete slabs for garden borders" presumably has reference to their use as an edging. The measurements of 12ft. of 6 by 1 inch is rather unwieldy, and could only be used on straight lines and then multiples of 12ft. in length. The article in the August number of the "Journal of Agriculture," page 101, on the manufacture of concrete posts could be followed in the making of these slabs, the chief difference being in the construction of the moulds. A short, well-designed cement block, such as is used as a kerbstone on a town footpath, would probably be most useful, and no reinforcement would be required.

(3) Correct humidity of the air under glass for setting fruit on a tomato crop is chiefly a matter of experience. If the house is unheated and the land was thoroughly watered before planting the air is unlikely to be too dry when the fruit is setting. When the houses are heated, however, there is a possibility of the atmosphere being too dry, and "overhead damping" has to be done to increase humidity. Some years ago when experiments were carried out by this Department on the subject of atmospheric humidity of tomato glasshouses it was found that a reading on the hydrodeik of more than 70deg. was unfavourable to the movement of pollen and the setting of the fruit, especially during the day. The experiments were in unheated houses, and a minimum reading was not worked out. As regards temperatures, 55deg. to 65deg. Fah. is about an optimum under average conditions, but in bright weather with abundant ventilation a higher reading will not be injurious. Successful production under glass depends chiefly on good judgment of plant condition and its amelioration by means of plant foods, water, and ventilation. A common mistake is to grow the plants too rank for heavy cropping.

Citrus Notes

Manuring, Picking and Spraying

BY late October and early November ploughing should be completed. On certain soils the turning in of blue lupins after the pods have dried and the stalks become woody has been found beneficial to soil tilth. The growing of green manuring crops over the winter months is regarded by some growers as a handicap for picking operations.

The present time, after harvesting the main crops of lemons and New Zealand grapefruit, is a suitable opportunity for the sowing of a quick-growing green manuring crop in orchards where no such crop was sown last autumn. Mustard has been proved suitable for this purpose. Sow at the rate of 15lb per acre, with superphosphate at the rate of 4cwt per acre.

Manuring

It is important with all citrus trees to maintain the supply of available nitrogen at this time of the year, as the turning in of a cover crop temporarily lowers the quantity of nitrogen available to the trees. Ammonium sulphate is a suitable form in which to apply the nitrogen. On clay soils it has a beneficial flocculent effect, and on acid soils this manure is retained for several months and nitrified slowly. Thus, it is quite satisfactory to apply the season's requirements of this manure in one application.

Phosphates are better applied over the whole orchard area at the time the green manuring crop is sown. If this has not been done, apply the phosphates in an organic form as deep as possible, as phosphates are slow in penetrating the soil and in being absorbed by the tree. Potash is better applied in the sulphate form, and should be added only when available nitrogen supply has been assured.

Pruning can now be undertaken whenever convenient. Concentrate on essentials first. Cut out sucker growth on the main trunk or in the centre of the tree, remove all crossing branches, undercut or shorten horizontal limbs which, with the weight of next year's crop, would touch the ground, and remove all dead and dying wood.

Picking

As the season advances, dark-green, immature fruit will be seen on young vigorously-growing lemon trees or where poultry-keeping is undertaken in conjunction with citrus fruit production. Such lemons should be allowed to grow into peel and picked when fully coloured, or, if being forwarded for curing, fruits should have reached the light green or silver stage of colour.

Spraying

Citrus verrucosis must be kept in check at this season of the year by the thorough application of 3-4-50 Bordeaux sprays. Many of the thrips seen in citrus blossoms at present are not the damaging citrus thrips, *Heliothrips haemorrhoidalis*, but as a preventive against the latter, nicotine sulphate 1 in 600 is recommended plus ½ per cent. summer oil.

Considerable damage is often done on orange trees at this time of the year by leaf roller caterpillar, *Tortrix* moth spp. The recommendation for control of this pest is 1½ lb. acid lead arsenate per 100 gallons of water. If applied alone, 3 lb. hydrated lime should be added to minimise the risk of scorching the foliage. If applied with Bordeaux, excess lime present in the 3-4-50 Bordeaux will be sufficient without further addition of lime.

—A. M. W. GREIG, Citriculturist, Auckland.

Vegetables, Small Fruits and Flowers

Contributed by the Horticulture Division

The Garden About The Home

EVERYBODY appreciates a garden about the home, even if they do not like gardening. Good tree shelter to break the force of prevailing winds and rain is of decided utility for those who have to spend much of their time outside. Shelter also greatly facilitates the maintenance of suitable temperatures in the house, while deciduous trees, well placed, afford valuable shade for property and stock during warm summer days.

These features, which necessarily include grassed open spaces of proportionate size, practically make up the garden, with, perhaps, areas for the production of fruit and vegetables. The selection of trees and shrubs for these purposes in any particular locality, their number, arrangement, and position, are matters requiring a great deal of consideration if they are to be done effectively and without loss of time. Time, in most instances, is the deciding factor, and where careful consideration is given generously the result is invariably good.

In addition to one's own experience and preference, it is advisable to study carefully the behaviour of mature trees and shrubs in the locality growing on a similar class of soil. In most circumstances it will be best to confine oneself to selecting chiefly those which have proved successful. The decisions reached should be recorded in the form of a plan to scale on graph-paper with squares about ten to the inch. Each operation in the undertaking can then be carried out in season according to plan as opportunity offers.

Gardening a Hobby

Where gardens and gardening afford pleasure, those living in homes in the country have special opportunities for the enjoyment of the art. Lawns may then be used for outdoor sports. An enclosed garden affords privacy and shelter for leisure moments, where, if garden seats are provided in shaded and sunny arbours, it will be popular with old and young at most seasons of the year.

The summer period now approaching is most suitable for studying the problems connected with the construction of new gardens and alterations and additions to old ones. By acting on this advice plans may be completed and ready for execution during the autumn months, which are in most circumstances the most suitable for that purpose.

Other work in the garden for November includes the planting out of half-hardy flowering annuals, dahlias, and chrysanthemums, and also training and tying up climbing plants and plants in the herbaceous border. Common diseases which begin to make their appearance at this season are rose aphis and mildew. To keep the plants quite free from these troubles it is often necessary to spray them at regular intervals, and an early start is a great advantage.

For the control of mildew, sulphur in one of its prepared forms is the best remedy. Probably the most generally useful is lime-sulphur, one part by volume to fifteen of water, applied as a fine spray in autumn as soon as the leaves fall, and again just before growth begins in the spring. At the present time colloidal-sulphur 2½ ounces to 4 gallons of water is best, or potassium sulphide one ounce to the gallon may be used.

For aphis control, any contact insecticide will destroy the insects. Nicotine sulphate 1-800 plus soft soap 2½ ounces to each 4 gallons of spray is commonly used. Because of their wonderful fecundity, reinfection soon takes place in fine weather, and spraying must be repeated. Where the attack is persistent, a weekly application is sometimes necessary.

Plant and Sow in November

VEGETABLES.

Plant out kumaras, cabbage, cauliflowers, Brussels sprouts, early celery and lettuce. Sow winter cabbage, cauliflower, broccoli, kale, globe beet, short carrots, spinach, salads, French beans, peas, sweet corn, cucumbers, marrows and pumpkins; in dry localities New Zealand spinach and in cool ones swede turnips.

SMALL FRUITS AND FLOWERS.

Plant out tomatoes, peppers and egg plants, passion fruit vines, tree tomatoes, Cape gooseberries and melons, and also flowering half-hardy bedding plants, dahlias and chrysanthemums.

—Wm. C. HYDE, Horticulturist, Wellington.

Improvement of Soil Fertility Is Way to Prosperity

THE shortage of organic manures makes it necessary, in most places, to compost carefully all available animal and vegetable material which can be reduced to a thoroughly decayed state in about twelve months. Large

bones and hardwood branches of any size should be burnt before being added to the compost. The materials should be built into a compact stack, with perpendicular sides, in a humid, shaded place. These conditions are the most conducive to decay.

The method usually adopted is to remove a foot or so of soil from an area 4 ft. to 6 ft. wide and as long as necessary, piling the soil in equal quantities on either side. In this trench hedge clippings, lawn grass, house waste, fowl manure, weeds, etc., should be built into a compact stack as it becomes available. When not more than about 4 ft. or 5 ft. high the stack should be sealed by covering it with the remainder of the soil which was removed from the foundation.

Soil for Seed Boxes

Where soil is required for seed boxes, potting and topdressing, a stack of sufficient size should be built of the top-spit of old pasture or similar material with the grass downwards. Now is the time to do this. If at the end of twelve months it is cut down, broken up, and restacked it should be ready after from two to three years of this treatment to form the main ingredient in a compost for the purposes mentioned.

Where grassland is to be broken in for cropping, a start may be made now by ploughing it shallow, just sufficiently deep to get beneath the roots of the vegetation to ensure the grass being turned upside down. When most of the turf is dead the land should be cultivated and harrowed to enable all twitch and other perennial weeds to be gathered and burnt before deep ploughing in readiness for planting a crop during the autumn.

The summer season usually affords good opportunities for cleaning dirty land in this way. If this is not done it may be necessary to sow the land down thickly with a cover-crop at the time of the first autumn rains with a view to smothering any weeds which remain.

Thinning the Seedlings

THINNING the crop is a formidable undertaking with growers who have a large area under horticultural crops. Where plants are crowded in the rows it is impossible to obtain a good crop unless the plants are thinned out. Thinning, under the best of conditions, is a tedious undertaking.

This labour may be almost entirely avoided by carefully spacing the seeds to the desired distance between plants. They may be sown sufficiently thin in the rows to produce a crop which will require little or no thinning out afterwards. If the seed should have a low germination percentage it will be necessary to sow the seed thicker than would be necessary if it had a high germination.

Weeding and thinning seedling crops should now be given prompt attention as required. Weeds should be destroyed during fine weather while still small and before they produce rough leaves. Thinning should be done shortly after rain, when the young plants draw easily.

Vegetables Raised from Seed Must Be Free from Weed Competition

TO produce good vegetable crops from seed, weeding requires close attention, especially while the crop plants are small. When the plants become large enough to cover the ground there is less danger of their suffering a setback from weeds in the competition for the available light, air, moisture, etc. Many crops are either lost by being overgrown by weeds or only small crops are harvested at an uneconomical cost due to the amount of labour spent on weeding.

Serious weeds such as couch grass or twitch should be worked out of the ground before sowing, although not infrequently one finds a grower hopeful enough to sow or plant a herbaceous crop in ground infested in that way. Most of the weeds present in the garden grow from seeds in the ground which have either been grown there, have blown in, or have been brought in by birds. Stable manure, straw, or organic matter of many kinds which are ploughed under to enrich the soil may include live weed seeds.

To prevent the introduction of weeds from such sources the material should be thoroughly fermented. By this means, in most instances, the seeds are sprouted and destroyed during the fermenting process or in the subsequent handling. Following deep cultivation, land which is considered to be clean sometimes produces a heavy growth of weeds from seeds brought up near the surface from below, where they have lain dormant for many years. Such is the hardihood of some weed seeds.

The labour and cost of weeding is greatly reduced if, during the preparation of the land for sowing, it is allowed to lie and settle down for a fortnight or so after deep and thorough cultivation has been given. This rest allows the weed seeds near the surface to germinate, when they may be readily destroyed on a fine day by means of a shallow stroke with the hoe. If the crop is then sown without further deep cultivation the labour of dealing with weeds is greatly reduced.

Retaining Phosphates in the Soil

THE efficiency of phosphates as a fertiliser has received attention recently in a contemporary journal, from which the following extract is taken.

"Phosphates have been applied sometimes assiduously, and more often intermittently, to English soils for nearly a hundred years; yet even at the end of this time we are still far from a complete understanding of their partition between the soil and the plants.

"At Cockle Park, where the pasture has been receiving a triennial dressing of 5 cwt. of basic slag per acre for over forty years, there is even today a marked improvement in the sward every time a dressing is applied. This continued response over such a span of years is not due to the exhaustion of the added phosphorus at the end of each three-year period, for only a tenth of the added phosphorus has been removed by the plants since 1897. The remaining nine-tenths has been locked up by the soil particles, and the roots possess no key that can unlock the door.

Hoarding Phosphates

"The degree to which soils retain phosphates is dependent both on their composition and environment. But all soils, whatever their composition or whatever the conditions, hoard a large share of the added phosphorus. The clay particle is the most miserly and heavy soils, therefore, fix more phosphorus than light soils. But the proportion of clay is not the only criterion; the degree of acidity also plays a part.

"In acid soils the phosphates combine with the iron and aluminium to form very insoluble compounds, and the plant is, in general, powerless to break this union asunder. In neutral soils, however, the phosphates join with the calcium, and, in the end, more phosphorus is available. Liming is therefore complementary to phosphates where acid soils are concerned, for, in addition to other benefits, it prevents a waste of phosphorus. Over-liming must be avoided, for where there is an abundance of calcium, as in chalky soils, the bondage between calcium and phosphates is stronger than in neutral soils.

"Neutrality is neither desirable nor attainable in many gardens; so then we must guard against a loss of phosphates by other measures. Firstly, the fertiliser should be well mixed with the top spit, or, better still, placed in a layer an inch or two below the seeds or plants. Secondly, the dressing should be generous so that the roots obtain their share."

Harvesting Berry Fruits and Tomatoes

FOR about three months during the Christmas period the main berry crops—strawberries, raspberries, and currants—are ripe, and mark the season of summer-time. Tree fruits, such as apples and pears, are practically off the market, and a good demand can always be relied on for these attractive berries.

Most of them are very perishable unless, for long distance shipping, they are picked in firm condition. Even when the greatest care is taken, such fruit as raspberries depreciate badly if subjected to much delay and handling. For this reason the markets to which these crops are to be sent should be given careful consideration before harvesting begins. The berries should be picked when dry and of even maturity, and packed in clean, bright packages. Where this advice is followed, consignments present a very attractive appearance to the buyer.

Tomatoes

In the management of tomatoes, when four or five bunches of fruit have set some nitrogen in the form of sulphate of ammonia or nitrate of soda may be included in the manurial treatments without fear of the plants bolting to rank growth, but, even so, moderate quantities at intervals of a fortnight are better than larger doses at longer periods. Where there is any doubt as to the most suitable prescription the following mixture may be tried and afterwards modified as may be found advisable from the reactions experienced in the plants. Dissolve ½ ounce nitrate of soda, 1 ounce superphosphate, and ½ ounce sulphate of potash to each gallon of water, and apply at the rate of about 1 quart of the solution to each plant the day after watering.

Before the fruit begins to colour it is usually advisable to lay a mulch of strawy stable manure or clean straw to conserve moisture and prevent splashing when watering. At the same time the base leaves up to about the first bunch of fruit are cut away and destroyed. Among other things, this assists the colouring of the fruit and improves the circulation of the air in the house.

During November tomatoes in the unheated glasshouse begin to ripen. Water, the application of fertilisers or liquid manure, and ventilation then require close attention to maintain health and vigour while the crop is developing. The treatment applied will depend on the condition of the soil and subsoil and also the climate, especially as regards temperature and sunshine.

Half-hardy Crops

During November the planting out of half-hardy crops, mentioned under this heading in the notes last month, should be completed. If this is done with care there will be little check to growth, and the crops will be earlier and bigger. To water the plants the day before transplanting is usually advisable. Some of the necessary precautions are: (1) Disturb the roots as little as possible; (2) do not expose the roots unnecessarily to the air; (3) plant firmly, deep rather than otherwise; and (4) avoid injuring the base of the stem when firming the plant in the ground.

—Wm. C. HYDE, Horticulturist, Wellington.

Review of Fruitgrowing Season

ALTHOUGH orchard operations during the 1938-39 season were somewhat hampered by the changeable weather experienced during the spring months, growers as a whole were able to carry out the necessary spraying and general orchard routine work.

Early in the season good crops of both pip and stone fruits were indicated in most of the commercial growing areas. Unfortunately, in Hawke's Bay high winds, which reached gale force during November, December, and January, materially reduced the crop in that district. Drought conditions which have prevailed throughout the Dominion since the beginning of January also seriously affected what otherwise would have been a heavy crop of both apples and pears through the failure of the fruit to size up properly, thus rendering a considerable quantity unsuitable for export purposes.

A redeeming feature, however, is that the dry conditions have resulted in the fruit being of very firm texture, and it should hold well both in cool storage and under ordinary storage conditions.

The stone fruit crop was a particularly good one, especially in Central Otago, where heavy yields were secured.

Small fruits were very disappointing, owing, chiefly, to unfavourable weather, and the supply of both raspberries and strawberries to the factories was greatly reduced.

There was a considerable increase in the area under tomatoes. The crop was, however, slow in reaching maturity, due to cold and windy conditions prevailing. The presence of virus disease caused fairly large losses in some of the commercial growing districts.

—Annual Report of the Director of the Horticulture Division.

APIARY NOTES

Contributed by Officers of the Horticulture Division

Swarming and Artificial Increase

IF the weather conditions are favourable, and unless precautions have been taken to prevent it, the bees will by now be making preparations to swarm. In some seasons when the spring is early and the bees are in good condition a few swarms will come off during September. This is especially likely to occur in the northern parts of New Zealand.

Swarming is the natural method by which bees increase. In the spring, when nectar and pollen are coming in freely, the queen begins to lay her eggs in increasing quantities. A good young queen is estimated to lay from two to three thousand eggs a day, so that it necessarily follows that while this is being kept up from two to three thousand young bees will be hatching out daily.

This means that unless extra room is provided by the bee-keeper the hive becomes over-populated, and this lack of space will often cause the bees to build a number of queen cells in order to provide a young queen before emigrating. This occurs any time after the queen cells are capped over, but generally on the first fine day after these are capped.

Prevent Swarming

The aim of the commercial bee-keeper is to keep down natural swarming as far as possible, and by so doing to conserve the strength of the colonies in order that they may gather as much surplus honey as possible. Beginners should remember the old saying, "The more swarms, the less honey."

Young Queens Desirable

It is, however, not always insufficient space that causes swarming; often it is because the queen is past her prime. The bees soon realise when a queen bee is beginning to fail, and will then start raising young queens either to emigrate or to supersede the old queen. When they are prepared merely to supersede the queen they only build one, or sometimes two cells, in which case they do not often swarm out but simply let the young queen kill the old one or, in some cases, drive her out of the hive to perish.

When a hive is preparing to swarm a number of bees will sometimes be noticed flying in front of the hive for a day or two beforehand, but this is not always the case, for they will often swarm out without any warning.

It is the old queen and adult bees that swarm out, taking with them three days' provisions of honey in their honey sacs and leaving behind all their accumulated stores and combs for the younger generation.

In spite of the wonderful intelligence or instincts of the bee they seem in some cases to fail in adopting the best means of self-preservation. For instance, under natural conditions, or if left to themselves, they will raise an unnecessary number of young queen bees and will throw off swarm after swarm, until the parent hive becomes so weak in numbers that they often die out from starvation or cold.

Artificial Increase

While swarming is the natural way to increase the number of colonies, the experienced bee-keeper can improve on this method by adopting what is often known as "artificial swarming" but is really "increase by dividing." This may be accomplished by several different ways. Perhaps the most popular is to make use of nucleus boxes and raise queens by artificial methods.

The nucleus box is made to hold three or four ordinary frames, and the nuclei are made by taking from a strong colony two frames of emerging brood with the adhering bees. These are placed with a frame of honey and pollen into each nucleus box, taking care to avoid putting in the old queen with them. This is best done towards evening, when the bees are likely to remain for the night. These nuclei are then put out in different parts of the apiary, given a ripe queen cell or young virgin queen in a cage, and left there until the young queen is laying.

When her brood begins to hatch out they can be changed into a full-sized hive and built up by steady feeding. In making these nuclei it is best to put in rather more bees than are on the frames, as there would be a certain amount of loss by the older bees going back to their old location.

Simple Method for Beginners

The simplest method of increase for a beginner is to wait until a hive has started building queen cells and is nearly ready to swarm. Then remove the old hive with queen and brood to a new stand a few yards away. Next take out two combs of brood with the adhering bees and place these into a hive, filling up the empty space with frames filled with full sheets of foundation comb or drawn combs, if available. Make sure that one of the combs has a capped queen cell on it, and also be careful to see that the old queen is left behind in the hive.

Place the new hive with the two combs of brood and frames on the old

(*Continued on Page* 351).

Notes for the Poultry Farmer

Contributed by Officers of the Livestock Division

Weaning Chickens

THE great art of the successful rearing of chickens is to be able to keep them growing without a check from the time of hatching until they reach adult age. There is really no given age at which they should be moved from the brooders and artificial heat, as so much depends upon the weather and just how the birds have done.

Generally speaking, however, well-grown White Leghorns should be ready for perching when between six and seven weeks old, but the heavy breed chickens usually need a couple of weeks longer. The brooder heat should be reduced by degrees and the chickens gradually hardened off, but it is a mistake to do this too suddenly.

Some poultry plants have been visited where it is a practice to turn off the brooder heat altogether during the day after the chickens are about three weeks old and to supply artificial heat only during the night. This, in many cases, is a mistake, for in every batch of chickens there are some which require warmth during the day, and if they cannot get this under the hover they will crowd together, which often starts other troubles which retard development and have a detrimental effect upon their future usefulness. It is not economy to turn off the heat during the day too soon, for the cost of a little extra heat is small compared with the extra earning power of well-reared pullets.

Lesson From the Hen

The mother hen gives a good lesson in this matter, for if notice is taken of chickens that are being reared in the natural way it will be seen that several times during the day, especially after feeding times, the chickens run under the mother hen and get warm, even after they are over four weeks old. It may not be for long, but those few minutes' warmth means a great deal to the welfare and future usefulness of growing stock.

Great care must be taken to see that their sleeping quarters are always dry, clean, and comfortable, for if their sleeping quarters are cold or damp the chickens soon get into the annoying and bad habit of crowding together.

After chickens are about three weeks old it is a good plan to reduce the heat about an hour after the birds have settled down for the night. This may be done by gently lifting the hover about an inch or two, that is, if the canopy type of brooder is in use. If a box brooder is used the lid may be lifted to give more air and prevent over-heating.

The weaning house will be all the better if it is not too big, but it must be well ventilated, yet free from draughts, and not too cold. If this house is open-fronted, it is advisable to hang some sacks or curtains in front at night for the first week or so after the birds have been weaned in order to

A useful ideal of a Utility White Leghorn cockerel.

harden them off gradually. As young stock are very liable to crowd together at night when first removed from the heat, it is well to visit their houses just as they are camping in order to train them to perch without crowding.

It is not advisable to make any change regarding feeding just when the chickens are being weaned, but to leave the change of ration until they get used to their new quarters. The change of quarters is quite enough, at times, to cause a slight check, but if a change of feed is given at the same time the two changes are likely to be drastic. If care is taken and attention given to the little details mentioned, however, the young stock should develop in a natural way and repay their owners for any extra time and attention given them during their growing period.

Ailments of Chickens

ADVICE is often asked as to the cause and treatment of chickens showing certain symptoms. While it seldom pays to treat sick chickens, the poultry-keeper is wise to do all he can to ascertain the cause of any trouble that he may experience with his stock so that proper preventive methods may be adopted, but before this can be done it is necessary to diagnose the trouble correctly.

Because of the fact that certain external symptoms are characteristic of a number of ailments it is often impossible to give very satisfactory answers to inquiries without examining some of the affected birds and knowing just how they have been handled and cared for.

It can be said that any unfavourable conditions of environment are liable to cause diarrhoea discharges. Again, most ailing chickens appear stupid, are noisy, and usually stay under the hover or crowd in corners.

At times, however, certain forms of discharge do indicate certain ailments and are a good guide to diagnosing the trouble. For instance, a frothy discharge from the bowels would indicate a chill, perhaps from exposure or a ground draught. Watery droppings, associated with excessive thirst, often indicate aspergillosis—a trouble affecting the lungs, and brought on by inhaling mould spores from damp, dirty, or mouldy bedding material. White, pasty droppings are a symptom of pullorum disease or bacillary white diarrhoea, but such is also likely to result from digestive disorder or an internal chill. Blood-stained droppings are an indication of coccidiosis, but the same symptoms may be an indication of blackhead, ptomaine poisoning, or enteritis.

However, as these forms of diarrhoea are not very easy to distinguish, if the poultry-keeper is experiencing trouble with his chickens and does not know the cause he is advised to send two or three affected birds to the Officer-in-Charge, Animal Research Station, Wallaceville, for examination, when a report will be forwarded with suggested treatment. There is no charge for the examination or report, but those sending birds for examination are expected to pay freight on such specimens.

Charcoal

THE fact that charcoal is readily eaten by birds of all ages is a good recommendation for its use, although some authorities question its real value. It is known, however, to be a great absorbent of gases and a useful digestive corrective, and for these reasons it is well to have a supply available to birds of all ages, especially those kept on the intensive system and where birds have only a limited range.

Charcoal is not difficult to make. Willow-wood is very suitable for the purpose. A trench should be dug about 3 ft. deep and, say, 3 ft. wide, and four or five feet long, according to the amount required. The wood should be cut to suitable lengths and placed in the trench. After a good fire has been made and fed so that the trench is a mass of burnt embers the top of the trench should be covered with sheets of old iron.

On top of this throw enough earth to exclude all air, but leave a draught-hole at each end of the trench. Later, these should be closed and the fire smothered. About twelve hours later the trench may be opened and the charcoal taken out. The charcoal should be broken in size to suit the age of the birds it is intended for.

Insect Vermin

NOW that the warm weather is at hand every precaution should be taken to guard poultry against the ravages of insects. The experienced poultry-farmer, as a rule, fully realises the necessity of keeping up a constant fight against insect pests, but unfortunately some uninterested poultry-keepers fail to keep their birds and houses as clean as they should be if the best results are to be obtained.

Once each week during the warm weather all perches should be painted with a good strong disinfectant. The nests should be kept clean and dry, and fresh, clean nesting material should be provided when necessary. Nicotine sulphate has been proved a wonderful material for ridding poultry of insects. It is best applied by placing a thin line of the material along the perches a short time before the birds go to roost. In order to make sure that the perches are free of dust and that the nicotine sulphate will not be wasted it is a good plan to wipe the perches over with a damp cloth before applying it.

—C. J. C. CUSSEN, Chief Poultry Instructor, Wellington.

APIARY NOTES — *Continued from page 349*

stand. This hive will be strengthened by the return of the flying bees. After the queen cell has hatched and the queen is laying it will require no further attention beyond supering according to its requirements.

It will, of course, be necessary to destroy any other queen cells that may be in the old hive, otherwise the queen is liable to swarm out. If, however, the queen is beyond her second season she could be destroyed and one queen cell left to hatch out.

Supering

About this time of the year colonies which have wintered in a fairly strong condition should be requiring more room, and a super of drawn combs or foundation wax should be given. It is not wise to allow the hive to become overcrowded before attending to the supering. As soon as the bees are covering from five to six frames an extra super should be added.

Food Stores

The question of food supplies will still require consideration, for in spite of repeated warnings and writings in this respect a large number of colonies are lost during October for want of stores. It is not sufficient to assume they have plenty because the bees are seen bringing in pollen. That is an indication that brood-rearing is in full swing, and it is at this time that large quantities of honey are used.

—G. V. WESTBROOKE, Apiary Instructor, Hastings.

N.Z. Federation of Young Farmers' Clubs

Edited by S. Freeman, Dominion Organizing Secretary

War-time Policy of Y.F.C.

Federation Appeals To All Members To "Carry On"

THE policy of the Federation during the war was discussed at the meeting of the Dominion Executive Committee held recently in Wellington. Members were unanimous that the movement should continue to function, and that, so far as restrictions and conditions could allow, its activities should be intensified.

This does not apply so much to field days and other activities which, it was recognised, would be difficult to carry on, but to the ordinary channels of the organisation and the continuance of interest within the clubs themselves.

It was decided to issue the following appeal to clubs and club members:

"It is realised that the country's first duty is to assist in winning the war, and in this connection the Y.F.C. movement can do more by continuing to operate than by going into recess. In continuing to function, activities of clubs in general should be diverted towards assisting in production, and much can be done by the organising of clubs and club members into emergency farm labour gangs or into emergency committees for other purposes.

"District Committees and councils should also carry on, and should not consider that their services are not essential, as the co-ordination of interest which accompanies their meetings is the foundation of the whole organisation.

"The Dominion Executive therefore appeals to all units of the organisation to see that interest in the movement is maintained and intensified, and desires that members should hold themselves in readiness to assist in the organisation of any such emergency measures as can be successfully implemented by the Young Farmers' Club Movement."

The action of the Dominion President, Mr. E. W. Barnett, in recently offering the whole of the resources of the movement to assist the Government in the present emergency was heartily endorsed by the meeting.

—DOMINION EXECUTIVE.

Woodville Field Day

THE Woodville Young Farmers' Club held a successful field day at the Woodville racecourse on 8th July. The field day began with dog trials, and there were nine entries for the first event, a short head and yard.

The results of a keen competition were:—W. D. Toogood's "Nellie," 1; R. Smith's "Sharp," 2; A. Fountain's "Mark," 3.

The judge was Mr. J. Tait, Dannevirke, who afterwards demonstrated the working of four dogs, yarding with three.

After an interval a Southdown judging competition was run off, the results being:—A. Compton, 1; A. Fountain, 2; L. McKay, 3. This was rounded off by a demonstration by Mr. W. Swift.

One of the most interesting sections of the day was the practical advice given by Messrs. Tait and W. Smythe on the handling and training of sheep dogs.

Horo Horo Y.F.C. Tour

A PARTY of 20 members of the Horo Horo Young Farmers' Club left Rotorua on 4th June under the leadership of Sir A. T. Ngata, travelling through the Bay of Plenty, Poverty Bay, and Hawke's Bay districts. The party visited the Maori Development Scheme en route, and also inspected the farms of Messrs. Black and Swinton, both former Bledisloe Cup winners.

Lectures on stock and the work in general were given at each Development Scheme as follows:—Ruatoki Scheme (Mr. Merritt, assistant supervisor), Te Kaha (Mr. Brown, head supervisor), Te Araroa (Sir A. T. Ngata), Tokomaru Bay (Sir A. T. Ngata), Wairoa (Mr. A. T. Carroll), and Mohaka (Messrs. McKay and Hingston). The party returned on 11th June after an enjoyable and instructive trip.

—T. D. KINGI, Secretary, Horo Horo Club.

Tour of New South Wales by South Taranaki Young Farmers

J. E. DAVIES, District Secretary, Department of Agriculture, Hawera.

Members of the party on board the Awatea.

FROM the point of view of the district committee the Australian tour was an ambitious venture which proved an unqualified success. The party, which was drawn from South Taranaki, comprised 31 Young Farmers' Club members, together with Mr. P. O. Veale, district president, as leader, and Mr. J. E. Davies, district secretary, as manager. Mesdames P. O. Veale and J. E. Davies also accompanied the party, which totalled 35.

The young farmers, all of whom paid their own way mainly out of savings during the previous year, comprised two dairy factory workers, three share-milkers, 12 farmers' sons, 12 farm workers, and two farming on their own account. The success of the tour was due in no small measure to the advance arrangements in equipping and preparing the party itself, the careful survey and estimation of transport and accommodation costs, and the provision of adequate introduction to the centres visited.

A standard dress, consisting of the official Y.F.C. blazer, dark grey flannel trousers, royal blue tie, and black shoes, was adopted. The value of a uniform style of dress was appreciated by the party, reducing the cost and quantity of the wardrobe of each member, and attracting attention throughout the tour.

The Tour

The party left Taranaki on May 25 via Wellington, and returned on July 3 via Auckland, being absent for 40 days. All transport and accommodation costs, together with the managers' expenses, entrance fees to places visited, and incidentals were covered by a charge of £50 per member. A surplus was devoted to a reunion of South Taranaki club members and their friends at a social and dance on the return of the party, at which films taken during the tour were shown.

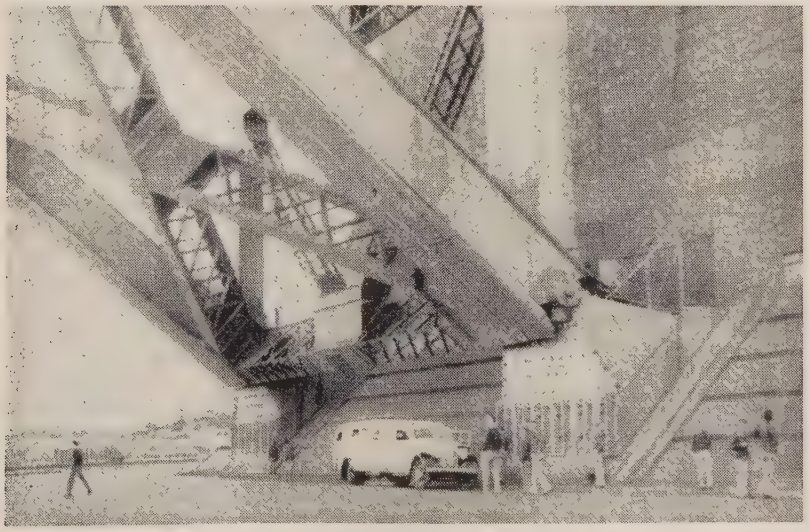
The tour was confined to a trip through the New South Wales coastal belts, that is, mainly dairying and fruit-growing districts north and also south of Sydney.

The Itinerary

Details of the itinerary must necessarily be brief. On leaving Hawera the party was farewelled by the late Mayor, Mr. J. E. Campbell, and well-wishers. At Wellington we were welcomed at Parliament House by the Hon. W. Lee Martin, Minister of Agriculture, Mr. R. B. Tennent, Director of the Fields Division, Department of Agriculture, and Mr. S. Freeman, Organising Secretary, New Zealand Federation of Young Farmers' Clubs. The party was regarded, said the Minister, as ambassadors of good will from the Young Farmers of New Zealand to their confreres in New South Wales.

After a calm crossing in the Awatea we arrived at Sydney in perfect weather, and were met by representatives of the New South Wales Primary Producers' Union and the Junior Farmers' Club Council, under whose guidance our itinerary in New South Wales was carried out.

An official welcome was extended by the following:—Mr. E. Breakwell, Organiser, Junior Farmers' Clubs, New South Wales; Mr. A. H. E. McDonald, Director of Agriculture; Mr. A. N. Binks, M.L.C., Chairman, Farmers' Dairy Co-operative Company; Messrs.



Members are impressed by the size of the girders under an archway of the Sydney Harbour Bridge.

G. W. Gordon and R. L. Fitzherbert, Vice-Presidents, Primary Producers' Union; Mr. J. L. Shute, General Secretary, Primary Producers' Union; and Mr. L. G. Ashton, Editor of the "Primary Producer."

In Sydney

Ten days were spent in Sydney, during which visits were paid to many places of interest, including the wheat silos, Sydney abattoirs, milk supply, and show grounds, Hawkesbury Agricultural College, Primary Producers' distributing stores, Sydney annual sheep sales, and, in addition, there were harbour excursions, sight-seeing tours, and visits to parks and gardens.

The country tour was made in two comfortable buses, and was a personally conducted tour arranged by the Junior Farmers' Council. We are deeply indebted to Messrs. A. L. Nicol, F. O. Sims, and J. Chalmers, Education Department, who, as Junior Young Farmers' Club organisers in their districts, arranged an excellent itinerary and accompanied the party. Visits were made to dairy farms and dairy factories, where detailed examination of buildings, plant, crops, and stock were made and very capable demonstrations were given. Sight-seeing visits included inspections of Junior Farmers' Club projects, urban amenities, Wollongbar and Grafton experimental farms, banana, pineapple, and orange plantations, and meat and steel works.

Civic receptions by day, with banquets, socials, and dances in the evening made up a well-balanced instructional and recreational tour which gave the party a wonderful insight into the farming life of the coastal areas of New South Wales.

Some Impressions

Probably the most outstanding farming impression was the reliance placed by dairy farmers on soiling crops such as maize, sorghum, and cane, as supplementary feed. These crops are chaffed and ensiled and fed out over most of the year in special feeding sheds, the herd being subsequently milked in another shed almost invariably by hand. Few used milking machines on the dairy farms visited, and the development of electric power was not as far advanced as in our own district.

Most of the dairy farms were concerned with the production of whole milk for the home market, and local factory contracts demanded an even milk supply throughout the year. For this purpose the Illawarra milking shorthorn was the dominant dairy breed.

Another striking contrast with New Zealand dairying was the remarkable knowledge of stock demonstrated by the farmers. Animal husbandry, breeding, feeding and management, including the balancing of rations, were their main interests. Discussions on such matters were relatively easy to start as compared with discussions on pastures and pasture management.

Banana and pineapple plantations on the North Coast.

Members found it difficult to account for the seemingly unprogressive use of pastures. Top dressing and the conserving of grass in the form of hay or silage were little practised. Farms generally were less mechanised, and facilities for watering stock and the use of concrete were not so well developed as in New Zealand.

The semi-tropical fruit growing, including oranges, pineapple, and banana plantations, were altogether new to us and extremely interesting.

Junior Farmers' Clubs

Junior Young Farmers' Club activities in New South Wales are similar in character to those of the Boys' and Girls' Agricultural Clubs in New Zealand, but are organised on somewhat different lines. Members are enrolled between the ages of 10 and 23 years, and project work, including stock-rearing, crop-growing, and domestic activities, with special club shows, rallies, and camps, serve to maintain the interest of members in farming generally. For local competitions, members are graded according to age, but inter-district and State competitions are open to all. We were impressed by the enthusiasm and sound organisation of the clubs generally. Each district has its own executive with a club member as secretary, and there is an air of self reliance.

The inspection of the practical work of the clubs was most enlightening and there was evidence that such work was proving of much practical value and that camps and shows were very popular.

Full-time organisers are provided by the Education Department. Each district organiser devotes his energies entirely to the fostering of club work by giving instruction and inspecting projects, and assisting with the organisation of rallies, camps, and shows, etc. The movement differs from our Young Farmers' Club Movement in that both sexes are enrolled and projects are featured. Difficulty is apparently encountered in retaining the interest of members up to the age limit, and the problem of providing for ex-club members is receiving attention.

Information regarding the activities and organisation of our Young Farmers' Club organisation was eagerly sought, and there was every indication that a similar movement to our own may be undertaken.

Appreciation

The Junior Farmers' Club Council of New South Wales, with its many local clubs, spared no effort to make our visit successful, instructive, and fruitful, and to them we offer our very best thanks. Mr. N. J. Simmons, council secretary, was a tower of strength. So numerous were their courtesies and concessions, and so ready the co-operation and assistance extended to the party both in New South Wales and in New Zealand, that it is not possible to express our thanks and appreciation to all individually who contributed to the success of this, the first overseas tour. We therefore thank you all.

Camp in Wellington for Y.F.C. Members During Centennial Exhibition

A DECISION to continue with the project was made at a recent meeting of the special committee appointed to make arrangements for the proposed Y.F.C. Camp in Wellington during the Centennial Exhibition period. As the Federation desires that the clubs should do their best to continue to function, it is therefore considered that it would be an admission of weakness to abandon the idea of holding the camp without first discovering what measure of support is likely to be forthcoming.

It will be readily understood that without the necessary support the camp cannot be run successfully or at a sufficiently low cost, and on this account club members who desire to attend are urged to send in their applications as soon as possible. Under normal conditions no trouble would have been experienced in filling the camp's weekly quota, but in the circumstances it has been found necessary to fix a minimum number of members participating and a minimum period during which the camp will be held in order to safeguard against financial loss.

Threefold Appeal

It has also been decided that any profit over the actual expenses of running the camp will be set aside to form the nucleus of a fund to assist in Y.F.C. land settlement. The activity should, therefore, present a threefold appeal to members: (1) The opportunity of spending a week in Wellington in order to visit the Exhibition at a cost comparing more than favourably with hotel and boarding-house accommodation tariffs; (2) the opportunity of meeting club members from other parts of the Dominion; and (3) the likelihood of assisting in the establishment of a fund for the settling of Y.F.C. members on the land.

The camp will be held from Thursday, February 1, until Thursday, March 28, 1940, a period of eight weeks. Members will attend the camp in minimum weekly batches of 100, and should sufficient applications be received, it may be possible to extend the period.

Members will be expected to bring their own blankets. Beds and mattresses will be supplied. A good standard of meals will be maintained, breakfast, tea, and supper being supplied at the camp. It is considered that it will be more convenient for those taking part to purchase their own midday meals in order to save them the inconvenience of returning to the camp.

Members will be accommodated in the Athletic Park Building, Wellington, which is centrally situated and within easy access of the Exhibition. The building is readily adapted for the purpose of the camp, and contains adequate conveniences, showers, etc.

Camp Fees

The charge to members will be £3 for the week, which will include, as stated, bed, breakfast, tea, and supper. Arrangements have also been made with the Railway Department for a special concession rate of approximately 20 per cent. reduction in second-class return fare.

Because of the shortage of cyclostyling paper it is impossible to send out the usual notice to club secretaries and district committees. Information regarding major activities will therefore appear in this section until further notice, and secretaries are requested to bring any advice of importance before their club members.

—Organising Secretary.

The closing date for application has been definitely fixed for November 30 next, and applications received after that date will not be considered. Members who wish to avail themselves of this opportunity of visiting the Exhibition should send in their application as soon as possible, together with the camp fee of £3.

It is important for each applicant to state the seven days in which he desires to attend (from Thursday to Thursday, during the period February 1 to March 28, 1940) and to give an alternative seven days in case the camp quota is filled for that particular week. If it is impossible to fit the applicant in for either of the two periods given, a further seven-day period will be allotted, and if this is not convenient to the applicant his cash will be refunded. It must be understood that it is necessary to collect the camp fee with the application in order to finance the undertaking and also to ensure that members sending in their names attend.

Support Urged

Members are urged to give special consideration to this offer and to forward their applications, accompanied by the camp fee, as early as possible to avoid disappointment, as it will naturally be a case of "first come, first served."

The camp is to be exclusively for club members, and while it is not expected that young men will join clubs merely to take advantage of the Centennial Camp, it can certainly be used as an incentive when recruiting new members.

In conclusion, members are reminded that the camp is being held for their benefit, and that they can help themselves and their fellow-members by supporting it. Emphasis must be laid on the following points:—(1) Applications close definitely on November 30 next; (2) first come, first served, and applicants should name an alternative week; (3) to avoid delay, each application should bear the member's full postal address, and should be accompanied by the camp fee of £3.

—Organising Secretary.

Dairy Cow Judging Competition

THE entries received, so far, for the Dairy Cow Judging Competition (particulars of which appeared in the August number of the "Journal") are not as numerous as was anticipated. Doubtless the outbreak of war has had an adverse effect on the competition, and on this account it has been decided to extend the time limit for judging one month in order to give members and others ample opportunity to take part in the competition.

Those intending to enter should fill in and cut out the application form in the August number of the "Journal" and forward it to me with the 1s entry fee. On receipt of this the judging form will be sent to them. The competition is open to all young farmers within the age limits of 14 and 30 years, whether club members or not. Should any intending competitor be unable to procure an application form it will be sufficient if he applies by letter, giving his name and address, and enclosing the 1s entry fee.

The closing date for the competition is now fixed for October 23 next. Applications should be made as early as possible so that the judging forms may be sent out in good time. It is hoped that members generally will do their best to make it a success.

—Organising Secretary.

Special Christmas Y.F.C. Supplement and Competitions

IN the December issue of the "Journal of Agriculture" the Young Farmers' Clubs' Section will take the form of a Christmas Supplement. The Section will be longer than usual, and will include a variety of special features.

The success of this supplement rests with the young farmers themselves. In collaboration with the Dominion Executive of the Federation, a number of competitions have been arranged, and the quality of the supplement will depend on the response of individual members.

First and foremost, the Dominion Executive is offering a prize of five guineas for the best essay on "A Scheme for the Settlement of Young Farmers on their own Properties." In this competition there is also a second prize of three guineas and two prizes of one guinea each. The essays must not exceed 2,000 words in length.

Prizes of one guinea will be awarded for the best contributions on the following subjects:—

1. "Farming 100 Years Hence."
2. "The Influence of Young Farmers' Clubs on Rural Life."
3. "How to Save Labour on the Farm."
4. "A Short Story with a Rural Background."
5. A Poem.

Contributions to the first four competitions should not exceed 1,500 words and the poem should not exceed 50 lines.

A photographic competition, arranged by Mr. R. B. Tennent, Director of the Fields Division, has three sections, for which separate prizes of one guinea each are being awarded. Those sections are:—

1. A Common Farm Task.
2. A Study of Livestock.
3. Any activity of Young Farmers' Clubs.

Photographs must be taken by Young Farmers themselves, but need not be processed by Young Farmers. The prints must be of at least postcard size, but mounting is not necessary. All photographs must have a title, which should be written on a separate piece of paper. The photographs will be judged on their general interest and the manner in which the subject has been presented.

The Dominion Executive has also decided to award a prize of two guineas for the best design of a blazer badge. The successful design will be published in the "Journal."

These competitions are open to all financial members of Young Farmers' Clubs.

Closing date; November 25, 1939.

Otago-Southland Club's Tour of the North Island

TWENTY-TWO Y.F.C. members, representing equally Otago and Southland, left Dunedin on 6th May on a tour of the Wellington and Taranaki Provinces. The party arrived at Wellington on the Sunday, and, after a sightseeing trip around Wellington on Monday morning, had lunch with a Manawatu touring party who were crossing to Picton in the afternoon on the first stage of a visit to the West Coast and Glaciers.

The party at Pukekura Park, New Plymouth. The leader of the party, S. R. Whyte, is fifth from the right.

At Manawatu

We travelled leisurely by railway bus to Palmerston North, making only one stop to see the New Zealand Woolpack and Textile Company's Plant at Foxton, where we were met by Mr. Vickerman, the manager.

On Tuesday we spent a very instructive day visiting the Plant Research Station in the morning and Massey College in the afternoon. Wednesday was also a full day, including a trip out to Bunnythorpe to visit the Glaxo factory. Afterwards we visited the Department of Agriculture's Seed-testing Station, which was a revelation to us, particularly as we learned that most of the samples came from the South Island. The ultra-violet ray test of ryegrass and the picric acid test of white clover made many of us realise to what extent science is assisting us in the selection of better seeds for our pastures.

Later we were met by Mr. C. J. Hamblyn, Fields Superintendent of the Department of Agriculture for Wellington Province, who had just returned from the big North Island camp at Hastings, where 200 Young Farmers were under canvas. He gave us a short address on the work of the clubs in the Manawatu district. In the afternoon we were the guests at afternoon tea of Mr. and Mrs. H. L. Lan-

caster at their farm at Kairanga. This farm was a veritable eye-opener to us, as it is 164 acres and has no cultivation other than a topdressing of 2cwt. of super per acre annually. On this block are carried 650 ewes, two horses, 40 registered cattle, and in the spring it is necessary to buy in 100 to 120 cattle to keep the feed down. In addition, he fattens his lambs, and this year bought 380 lambs after getting his own away. It is a tribute to the exceptional productivity of the farm, and reflects a great deal of credit on Mr. Lancaster as a farmer.

In the evening came our first social event, the Young Farmers' Ball at Whakaronga, which we greatly enjoyed.

After visiting the new military aerodrome at Ohakea, we were met in Wanganui with an invitation for lunch as the guests of the District Committee. We then visited Messrs. Kempthorne, Prosser's Aramoho fertiliser works before leaving for Hawera, where we arrived in time for dinner.

At South Taranaki

At Hawera we were given a civic reception from the late Mayor, Mr. J. E. Campbell, and Councillor P. O. Veale, who is also chairman of the South Taranaki District Committee. We were then taken out to the Turuturu Mokai Redoubts, where Messrs. John Houston and W. R. Jones explained the historical associations of the pa and the latter taught us a haka. To complete the morning we saw the Maori carvers at work, Mr. Houston acting as commentator.

In the afternoon we were shown through the Renco laboratories at Eltham, and were entertained to afternoon tea by the chairman of directors and management. The evening saw a crowded hall for the dance arranged in our honour by the South Taranaki District Committee.

The party at one of the dairy farms visited during the trip.

North Taranaki

We had a leisurely trip through to New Plymouth, stopping en route at the Stratford Demonstration Farm, where we were received by the farm committee, North Taranaki District Committee, members of the local clubs, and Farmers' Union.

After lunch at Stratford we visited Burgess Park, a beautiful reserve set in the hills and bequeathed to the city of New Plymouth by one of its many public-spirited citizens. New Plymouth was reached at 3 o'clock, and we were immediately impressed with its natural beauty and with its many parks and reserves.

Sunday was a perfect day, and Mr. G. A. Blake, Fields Instructor, proved an excellent guide for our trip round the parks in the morning, and to Mount Egmont in the afternoon. At the hostel on the mountain we were entertained to afternoon tea by the District Committee and returned to our hotels very satisfied with our outing. On Monday, we proceeded to the furthest north point of our tour, Urenui, where Mr. J. J. Freeth showed us an excellent example of pasture management. Mr. Freeth's aim has been to establish a pasture which will provide green feed for his stock all the year round, and he has certainly succeeded. By the establishment of prairie and paspalum he has accomplished a continuance of feed, and to most of the party this was one of the lessons in the practical aspect of the tour.

The afternoon saw us at Mr. J. H. Paulger's property at Tikorangi, where the aim is to secure special purpose paddocks for successional grazing. Later we went on to the model farm of Mr. J. N. Blyde at Lepperton, and were astonished at what can be produced in a district like Taranaki when special attention is given to pasture management. Our last evening in Taranaki was spent as guests at a dance of the Hillsborough-Tarurutangi Y.F.C.

At 9 o'clock the next morning we left New Plymouth on the longest trip of the tour—160 miles to Feilding. Stops were made at Omata to see what must be the finest cowshed in New Zealand, that of Mr. A. Wood. Although few

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of the party were dairy farmers, this shed, which on today's figures would cost £500, was a revelation in what a model cow byre should contain. We lunched at the Waimate West Demonstration Farm as guests of the farm committee, and later inspected the farm.

We arrived at Feilding at 6.15 to have dinner and dress for another pleasant dance provided for us by the local Y.F.C. The following morning was most interesting, visits being paid to the only community centre in New Zealand, the Feilding High School, and to Mr. Mason's Milking Shorthorn Stud.

Wairarapa

We returned to our hotels for lunch and then left for Masterton, the weather being perfect and the trip most pleasant. Next morning we viewed Mr. Wilton's Lincoln Stud and we were very interested to see the unusual breed and to hear of its comparison in weight of wool compared with the other coarser types. Morning tea provided by Mrs. Wilton, followed by a drive to a vantage point on the hills to see the Wairarapa, concluded a pleasant morning. In the afternoon we saw Mr. R. M. Perry's Southdown Stud, and later were the guests of Mr. and Mrs. McGregor for afternoon tea.

Our last night in the North Island was spent at Featherston in order to give us a good early start for Wellington next day. The itinerary had been altered, and provided for the morning at the Wallaceville Laboratory and the afternoon at the Ford factory at Petone. Both visits proved to be most interesting, and we arrived in Wellington at 4.30.

Now, in retrospect, one can perhaps summarise the reasons for the success of the trip, as follows:—

1. The itinerary was arranged between the Wellington and Otago-Southland Councils so that the details were co-ordinated at a central point and any duplication of types of visits was eliminated.

2. The size of the party made for easy handling and for all members to become quickly and easily acquainted.

3. Travelling was reduced to a minimum, enabling us to be fair to our hosts and at the same time preventing the lads from becoming travel-weary—three nights were spent at Palmerston North, two at Hawera, three at New Plymouth, one at Feilding, and two in the Wairarapa.

4. All tastes were catered for, as attention was given to the educational, cultural, and social espects.

Appreciation

The party wishes to thank all who in any way contributed towards their entertainment, and in particular to the honorary secretary of the Wellington Council, Mr. F. E. Sherwood, and to the Instructors in Agriculture for their thoughtfulness and thoroughness in all the details of the tour.

Progress of Masterton Young Farmers' Club

D. McGREGOR, Chairman, Masterton Club.

PIONEER club of the Wairarapa district, the Masterton Y.F.C., was formed on 28th November, 1934, ten members being present. From that date onward rapid progress has been made, until today the club membership stands at about 80, having been at one stage as high as 90 members. Since its inception all meetings have been held in the rooms of the A. and P. Association, which offer us ideal accommodation for all our requirements. We are indebted to the association for all valuable assistance rendered to us through the years.

The Masterton Club was fortunate in having behind it during earlier years such stalwarts in the Y.F.C. movement as Messrs. W. F. McLaren and S. Freeman. Mr. McLaren, who is immediate past president of the federation and who has done such valuable work for the movement throughout the Dominion, was the first advisory president of the club, and Mr. Freeman the first Wairarapa district secretary.

Reviewing the past history of the club it is interesting to note that Mr. Freeman gave the first lecture at a club meeting, his subject being "Ensilage and Haymaking." The first field day was held on 3rd May, 1935, at the Solway Showgrounds, attracting an attendance of 150 farmers and others. Proceedings were opened by Sir William Perry, and practical demonstrations were given on throwing a horse, setting a plough, and a post mortem examination on a sheep. As a result

Members of the Masterton Y.F.C.—Seated (from left to right): G. Blatchford, J. M. James, W. F. McLaren, W. James (advisory president), D. McGregor (chairman), C. A. McKay (secretary), N. Lamont (Department of Agriculture), C. Welch, G. MacGillivray (treasurer), and J. S. MacKay.

of the field day the membership was increased considerably, and from then on the club progressed rapidly. The first Y.F.C. camp in the North Island was held in Masterton in May, 1936, and did much in strengthening clubs in the Wairarapa and other districts.

Stock Judging and Debates

Members have been successful in stock judging competitions held from time to time, and of these, competitions at local A. and P. shows have been a feature. In the annual judging competition for the "Point Blank" Challenge Cup, organised by the Wairarapa District Committee, Masterton has succeeded on three consecutive occasions.

Club debates and inter-club debates have proved very popular. In particular a debate with the Tinui Club on the subject, "That the Young Farmer of Today has Equal or Better Opportunities than his Grandfather," was a great success. At the December meeting last year a club debate took place, the subject being "That a Dairy Farm takes more Managerial Ability than a Sheep Farm." All members present were asked to speak, and three minutes were allowed for each speaker. Members are also encouraged to give short talks at meetings, and these have been of a high standard. The purchase of an urn and the introduction of supper after meetings has brought members closer together, and more enthusiastic meetings have resulted.

The club has been fortunate lately in securing some informative talking pictures. At the November meeting last year the organising secretary visited the club and showed some interesting films on the Y.F.C. projector. Another film entitled "Reproduction Among Mammals" shown in April of this year created much interest. Other films have also been shown, and it has sometimes been necessary to arrange special meetings.

Socials

All dances held by the club were eclipsed by our annual dance in the Town Hall last year, when more than 500 people were present. The "Point Blank" Cup and miniatures were presented by the district president, Mr. W. James. Another successful dance was that held last April in honour of the visit of the Young Farmers team from the United Kingdom, who were billeted by local members during their three days' stay in Masterton. Also present was the New Zealand team which visited Australia last year.

An annual feature of the club is a table tennis match with the Carterton Club. The game of darts after meetings has already proved popular.

Future Activities

Published in the Wairarapa this year by the district secretary, Mr. N. Lamont, is a booklet in which the club programmes for the year, together with district and provincial events, are set out. This publication has been favourably commented upon by members from other districts. The booklet enables both club members and potential members to know what is arranged for months ahead.

Mention must be made of the fact that Mr. J. Blatchford, the first secretary of the club and present executive member, has never missed a meeting of either the club or the executive—a record of which few can boast.

Fitzherbert Club's Field Day

IN perfect weather a large crowd gathered at Linton recently for the field day organised by the Fitzherbert Young Farmers' Club. Farmers, Young Farmers, and friends from Tokomaru and Opiki gathered at Mr. L. H. Craw's farm, "Lock Moigh," Linton, to witness a demonstration on the breaking in of young horses by Mr. Thos. Nolan, Feilding. Mr. Nolan is a past master in the art of "breaking," and he imparted knowledge gained by him in a lifetime's experience with horses. The demonstration was not without its thrills as these horses were among the wildest procurable in the district.

Unfortunately, in the construction of the yard, members under-estimated the strength of the horse, which had no difficulty in breaking free on two occasions, finally tackling a high fence. Another horse was brought forward while the yard was strengthened, and Mr. Nolan showed how it should be done.

After lunch at the Linton Hall the party proceeded to Mr. C. H. Jensen's farm at Opiki to inspect his model piggeries. These piggeries proved ideal in every respect, and Mr. Jensen explained special features, among which were grass yards connected with each pen, ventilation and insulation of sties, sanitary arrangement of pens and drains, a bail for ringing sows, and a special "creep" for the feeding of young pigs. At this stage Mr. J. Woodley, Aokautere, demonstrated a patent device for castrating and ringing weaners.

A hearty vote of thanks was passed to Mr. Nolan and Mr. Jensen by the party. —*F. J. S. HOLDEN, Fields Instructor, Palmerston North.*

Among the Clubs: Reports on Activities

Western Southland.

Dipton.—Address by Mr. G. Hamilton, Lumsden, on "Farm Management." Club debate, "Should Military Training be Compulsory?" The teams were:—D. Milligan, J. Palmer, W. Ryan, B. Wilson (affirmative) and M. English, G. Helen, C. Gray, A. Mudie (negative). The decision was awarded to the negative team. At a previous meeting talks were given by club members:—J. Miller (tussock grass farming); C. Gray (management of the team); J. Nevin (drainage); and D. Milligan (top-dressing).

Drummond. — Competition for prepared speeches.

Thornbury.—Speech competition by club members. Result:—J. McKenzie (trees), 1; K. E. McKenzie (fencing), 2; J. Fallow (milk fever), 3. Impromptu speeches by Messrs. Atchison and Buchan on "Medicine" and "Democratic and Totalitarian Farming" respectively.

South Otago.

Clinton.—Arrangements for field day. Address by Mr. Casey, St. John's Ambulance Instructor, on "First Aid on the Farm."

Lawrence.—Exhibition of cinematograph films by Mr. J. W. Woodcock, Department of Agriculture.

Milton.—Address by Mr. Grant, engineer, P.W.D., on "Concrete" and "Explosives." At a previous meeting an account of their recent trip to Dunedin was given by J. H. McCallum and G. Moore.

Central Otago.

Stirling.—Decided to continue with the Centennial tree planting scheme. Several donations of trees received. Talk by Mr. W. R. Christie on "Trees and Tree-planting."

Roxburgh.—Report on educational week in Dunedin. Impromptu speeches by club members.

Upper Clutha.—Arrangements for field day. Address by Mr. A. M. Douglas on "Trees and Tree-planting." At a previous meeting a lecture by Mr. S. Freeman, Organising Secretary, on "Young Farmers' Clubs and their Activities."

Dunedin.

Middlemarch.—Business meeting. Arrangements for club dance.

West Taieri.—Talk by J. Grant on "The Young Farmers' Educational Week."

North Otago.

Duntroon.—Display of films on agricultural activities in the district by Mr. H. Reid. Lecture on "The Problems of the Mower" by Mr. E. Reid.

Enfield.—Mr. B. B. Blackmore presented an address prepared by Mr. B. B. Watson entitled "Farm Finance."

Five Forks.—The following resolution was passed: "That this Club offers as an organisation to render service of a national value in this country"; also it was recommended "That the Federation of Young Farmers' Clubs use its organisation in the same manner for Dominion-wide service."

Hampden.—One guinea to be donated to donated to Centennial Celebration Fund to be devoted towards the building of a rest room in Oamaru. Address by Mr. W. Gillies, of Hampden, on "The Royal Show, Hamilton, 1938"; the speaker was a judge at this show.

South Canterbury.

Arno.—Address by Mr. Bevin on "Farm Management." At a previous meeting a lecture by Mr. W. D. Blair, Department of Agriculture, on "Diseases among Livestock."

Fairlie.—Lectures by Mr. E. J. Lukey, Veterinarian, and Mr. A. Grant, Department of Agriculture, on "Diseases of Sheep" and "Covering of Lambs and Rugging of Hoggets" respectively. At a previous meeting a club debate "That Present Methods of Farming in New Zealand are Uneconomic and Obsolete" was won by the negative team, consisting of A. P. Whatman, C. Goulter, and B. O'Neil. The affirmative team consisted of M. J. Kirke, D. Lundie, and D. Scott.

Geraldine.—Arrangements for dance. Committee appointed to organise Stock-valuing Competition for Young Farmers in the District. Lecture by Mr. C. C. Leitch, Department of Agriculture, on "Pasture Mixtures Establishment Control." At a previous meeting Messrs. S. R. Muff and J. Crotty gave talks on "Cattle Judging" and "Sheep Judging" respectively.

Hunter.—Messrs. A. J. Davey and J. Dempsey of the Farmers' Union addressed the meeting on "The Work of the Union."

Maungati.—Arrangements for special meeting to organise Mock Court. Talk by the Rev. Wilson entitled "England and the English."

Milford.—An address by Mr. Tait, traffic inspector, on "Motor Regulations and the Road Safety Campaign." Mr. Tait was assisted by two of his colleagues. An interesting discussion took place on the traffic regulations as they affect the farmer.

Pleasant Point.—The following members were congratulated on their success in South Island Stock Judging Championships held recently at Lincoln:—J. France (winner South Island Championship); O. R. Chapman (2nd, S.I. Championship); I. Chapman (4th, S.I. Championship); and H. N. McHaffie (1st in Ayrshires).

Southburn-Lyalldale.—Debate held, the subject being "That labour-saving machinery introduced into farming in the last twenty years has not been to the advantage of the rural community." Teams were:—R. Gray, A. Copland, and K. Cand (affirmative) and A. Bishop, M. Toohey, and J. A. Ward (negative). The judge, Mr. N. Gray, decided in favour of the negative team. The following team was selected to represent the club in the forthcoming inter-club debates:—A. Bishop, R. Gray, and M. Toohey.

Waihouranga.—Arrangements to hold pruning demonstrations. Lecture by Mr. W. A. Blair, Department of Agriculture, on "The Running and Organisation of the Agricultural Department." Field day held on Pentlands Hills Station. Demonstrations included the following:—Horses (Mr. F. Brown); Shorthorn cattle (Messrs. F. Brown and J. McKenzie); Corriedale sheep (Messrs. A. Grant and C. H. S. Thompson).

Mid-Canterbury.

Hinds.—The following speakers selected to represent the club in inter-club debate:—E. Rhodes, B. Simmonds, and D. J. Tait.

Methven.—Lecture by Mr. T. Ewer, Stock Inspector, Department of Agriculture, entitled "Lambing Troubles."

Christchurch.

Darfield.—Debate with Farmers' Union, the subject being "Does Irrigation Pay?" Teams were:—Club: D. Selby, B. Jarman, R. Fechney, and J. Gallagher (affirmative) and the Farmers' Union team:—Messrs. G. H. Buttle, F. Crompton, M. Jenkins, and V. T. Cullen. The judge, Mr. F. A. Ball, awarded the decision to the Club team.

Ellesmere.—Field day to be held at the Rangitata irrigation scheme. The following members were congratulated on their success in the South Island Y.F.C. Stock Judging Championships held recently at Lincoln:—D. Hu.ford (1st in horses, 1st in Shorthorn cattle) and M. Brooks (3rd in Romneys). Lecture by Mr. P. G. Stevens, Lincoln College, on "Animal Husbandry." The speaker dealt particularly with the fat lamb and bacon trade from a carcass point of view.

Teddington.—Address on "National Defence" by Major Livingstone. Field day held at N.Z. Breweries, Ltd., and Wigram Aerodrome.

North Canterbury.

Amberley.—Lecture by Mr. E. L. Siddall, Veterinarian, Department of Agriculture, entitled "Ewe Management and Lambing Troubles."

Cust.—Addresses on "Hydatids Control" and "Tour of Australia" by Dr. Marshall and Mr. T. Stevenson, respectively.

Westland.

Murchison.—Display of cinematograph films by Mr. A. D. Mercer, Department of Agriculture, entitled "Hog Production in U.S.A.", "Land Clearing," "Our Daily Bread," and "Salt of the Earth."

Nelson.

Motupiko.—Club debate held, the subject being "Horses v. Tractor."

Moutere.—Business meeting. Lantern lecture by Mr. D. M. Merry, Department of Agriculture, on "Lime and its Benefits."

Marlborough.

Blenheim.—A talk on "National Defence" was given by Major Horton and Sergeant Wilson gave demonstration of the working of the Bren gun. At a previous meeting a debate was held between club members, the subject being: "Is Compulsory Military Training More Beneficial to the Defence of New Zealand than Voluntary Training." Mr. Ryan, Farm Dairy Instructor, Department of Agriculture, gave a lecture on "Dairying." A mock court by club members was held. The officials were:—D. R. Wilkie (prosecuting counsel); R. Litchfield (defendant's (counsel); A. W. Rose (judge); T. M. Walsh (court orderly).

Flaxbourne.—Arrangements for annual dance. Discussion and suggestions for Y.F.C. show parade. Address by Mr. F. W. Sharpe on "The Training of Sheep-dogs."

Wairarapa.

Alfredton.—Lecture by Mr. E. Bruce Levy, Director, Grasslands Division, Plant Research Station, on "Hill Grasslands—Some Aspects of Grassing Management" and "Secondary Growth Control." At a previous meeting a question evening was held on "Lambing Troubles." Mr. Armstrong, Veterinarian, was present.

Carterton.—Lecture "Pasture Development and Management on the More Difficult Soil Types" by Mr. E. B. Levy, Director, Grasslands Division.

Greytown.—Question evening on "Lucerne."

Martinborough.—Lecture by Mr. E. Bruce Levy, Director, Grasslands Division, on "Pasture Development and Management on the More Difficult Soil Types."

Masterton.—Report on annual dance showing a profit of £27 12s 8d. Lantern lecture by Mr. E. Bruce Levy, Director, Grasslands Division, on a comparison of Pasture Development and Management in New Zealand and Overseas.

Manawatu.

Apiti.—Lecture by Mr. K. Kramna on "Geology in Relation to Oil Surveys." The speaker dealt with the rock strata, illustrating his talk with photographs.

Bunnythorpe.—Guests of Kairanga Club at an address by Dr. McMeehan on his travels overseas. Lecture by Mr. H. de O. Chamberlain, Department of Agriculture, on "Potato Diseases and Potato Grading."

Fitzherbert.—Report on recent dance, showing a profit of £3 14s 3d.

Halcombe.—Discussions by members on the following subjects:—"Rope Splicing," "Lambing Malpresentation," "Internal Marketing of Farm Produce," and "Mole Draining Procedure."

Levin.—Talk on "Y.F.C. Activities" by Mr. S. Freeman, Organising Secretary. Exhibition of sound films of general interest by Mr. Freeman.

Opiki.—Lecture by Mr. L. Earl, Department of Agriculture, entitled "Control of Grasslands."

Oroua Downs.—Picture display by Mr. F. J. S. Holden, Department of Agriculture, on subjects of agricultural interest.

Otaki-Te Horo.—Lecture by Mr. D. H. Le Souef, Veterinarian, Department of Agriculture, entitled "Veterinary Science."

Pohangina Valley.—Addresses as follows:—"Flying" (Mr. H. Linklater); "Electric Fences" (Mr. J. Linklater); "Rotational Grazing" (Mr. J. Linklater).

Rongotea.—Talk by Mr. H. J. Lancaster on "A Trip to Australia."

Shannon.—Business meeting.

Tokomaru.—Business meeting. Report on club dance.

Waikuna.—Club debate on subjects selected for Viles Debating Shield Competition.

Whakarongo.—Impromptu talks. Address by Mr. J. J. Stevenson "Farming in Australia." At a previous meeting arrangements were made for a field day. Club debate "That Hay Baling is Superior to Hay Stacking." Teams:—I. Tabor, B. Dickson, and K. Sly (affirmative) and R. Berry, G. Spall, and J. Spall (negative).

Woodville.—Address by Mr. D. M. Murray on "Ensilage Making."

Wanganui.

Mangaweka.—Arrangements for dance. Club debate "That Dairy is Better than Sheep-farming" which was won by the affirmative team.

Marton.—Address by Mr. D. S. Hart, of Feilding Agricultural High School on "Lambing—Its Troubles and Their Prevention."

South Taranaki.

Hawera.—Account of annual meeting of the Federation by W. Phillips. Talk by Mr. J. C. Findlater on "World Affairs—The Problem of the Pacific."

Kaponga.—General discussion on current topics. Talk on "The Australian Tour" by J. Phillips.

North Taranaki.

Cardiff.—Talk by R. Smith on his trip to Australia.

Inglewood.—Debate held, the subject being: "That Hay and Root Crops are Preferable to

Hay and Ensilage." The speakers were A. B. Blackbourn, E. Rowan, and J. Evans (affirmative) and M. Sutton, D. Klenner, and J. Kublinski (negative). The judge gave his decision in favour of the negative team.

Karawaka.—Report on club dance and euchre party. Discussion regarding future activities of the club. Lecture by Mr. G. A. Blake, Department of Agriculture, on "Hay and Ensilage.' ' A debate held with the pupils of the Lepperton School, the subject being "That in New Zealand Greater Emphasis Should be Placed on the primary rather than secondary industries." The teams consisted of:—School, H. Wallace, R. Portway, R. Crowe, and F. Snowball (negative); club, K. Lattimer, L. Oliver, I. Julian, and M. Loveridge. The judge, Mr. D. Mackay, Senior Inspector, Taranaki Education Board, awarded the decision in favour of the school team by 64½ points to 63½. Two field days held, one on the property of Mr. A. Turnbull, Huirangi, the other on Mr. J. Cloke's property, Lepperton.

Mangorei.—Addresses as follows:—"Sheep" (Mr. Addenbrook); "Rearing of the Jersey Calf" (Mr. Pearce); "Run Cattle" (Mr. Jackson).

Tikorangi.—Discussion on card evenings. Talk on the educational week at Hastings by two club members.

Southern Hawke's Bay.

Norsewood.—Impromput speeches by club members.

Onga Onga.—Talk by Mr. E. S. Bibley on "Farm Gardens."

Takapau. — Discussion on Centennial Memorial tree-planting scheme. Address by Mr. C. J. Bell entitled "The Farmers' Place in the Community."

Poverty Bay.

Matawai.—Address on "The Work and Activities of the Y.F.C. Movement Throughout New Zealand," given by Mr. S. Freeman, Organising Secretary.

Te Awamutu Club Field Day.—Post mortem on a cow conducted by Mr. G. B. Melrose, Inspector of Stock. Centre, Mr. Melrose; left centre, Mr. C. W. Eyre, club chairman

Te Kuiti.

Otorohanga.—Address by Mr. D. V. Bryant on his recent experiences abroad. Visit to Auckland Farmers' Freezing Co., Ltd., Horotui works to witness killing and handling of bobby calves for freezing and export. Field day at Mr. K. M. Montgomery's residence for a pruning demonstration by Mr. J. W. Whealn, Orchardist, Department of Agriculture.

Eastern Bay of Plenty.

Waimana.—Addresses as follows:—"Past and Future of Y.F. Clubs" (Mr. H. White); "Birds and Their Uses" (Mr. W. Macdonald); "The Magpie" (Mr. D. O'Kane).

Western Hawke's Bay.

Katikati.—A lecture by Mr. A. V. Allo, Department of Agriculture, entitled "Lucerne Growing."

Paengaroa.—Field day held on the properties of Messrs. Hewison and Viles. Demonstrations included the following:—"Castration and Docking of Lambs" (Mr. Viles); "Farm Management" (Mr. Mitchell); "Drenching" (Mr. Viles); "Mothering of Lambs" (Mr. Hewison). Lecture by Mr. A. V. Allo, Department of Agriculture, Tauranga, on "Lucerne."

Te Puke.—Arrangements for club dance. Discussion on radio sessions.

Waihi.—Arrangements for club dance. Talk by Mr. H. Chester on the Northern tour.

Waikato.

Te Awamutu.—Field day held at Mr. Lee's slaughter yards. Mr. G. B. Melrose, Inspector of Stock, conducted a post-mortem on a cow, and lectured on "Seasonal Diseases."

Te Kowhai.—Business meeting.

Auckland.

Clevedon.—Talk by Mr. Cook, the subject being "The International Situation."

Harrisville.—Two club debates held, the subjects being (1) "Horses v. Tractor" and (2) "Pigs in Stys v. Pigs in Small Runs."

Mangatawhiri.—Lecture and display of cinematograph films by Mr. H. M. Pierson, Extension Officer, Swine Husbandry, Department of Agriculture.

Warkworth.

Kaukapakapa.—Moving picture programme by Messrs. P. S. Syme and E. B. Glanville, Department of Agriculture.

Port Albert.—Moving picture display by Mr. Bundal.

Dargaville.

Arapohue.—Lecture by Mr. E. H. Arnold, Department of Agriculture, on "Principles Underlying Breeding of Animals and Plants."

Maroheno.—Arrangements for dance. Address by Mr. K. Fergus on "A Tour of the South Island."

Ruawai.—Appointment of representatives to district committee. A talk by Mr. J. M. Smith, Department of Agriculture, the subject being "Otago and Southland."

Tangiteroria.—Display of cinematograph films by Mr. E. B. Glanville, Department of Agriculture.

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Special Precautions for Safety

Health Notes for the Farm

Contributed by the Department of Health

Take Care Of Your Feet

Ill-Fitting Boots or Shoes Demand a Penalty

It is a wondrous thing, the human foot—like the human hand; even more so, perhaps. But, unlike the hand with which we are so familiar, it is seldom a thing of beauty in civilised adults who go about in leather boots or shoes, so that it is hidden away in disgrace, a thing to be thrust out of sight and forgotten. It can be sometimes very ugly indeed—the ugliest thing there is even in the fairest and highest and most gifted of her sex, and then it is often ugliness to chill and kill romance and scatter love's young dream and almost break the heart, and all for the sake of a high heel and a ridiculously pointed toe—mean things at the best! Conversely, when Mother Nature has taken extra pains in the building of it, and proper care or happy chance has kept it free of lamentable deformities, indurations and discolourations—all those gruesome, boot-begotten abominations which have made it so generally unpopular—the sudden sight of it uncovered comes as a very rare and singularly pleasing surprise to the eye, that has learned how to see.

—Du Maurier, *"Trilby."*

THE importance of the care of the feet cannot be over-estimated, for how manifold are the functions of the human foot. "However hard the labour, whatever the weight carried or drawn, whatever the distance to be walked or run, whatever the space to be leapt or the height to be climbed, the foot has also and always to sustain the super-imposed human frame—not as a mere solid immovable mass, but with a fostering through firm elasticity, without which the several actions could never be performed save with an amount of jarring and concussion as would inevitably destroy the brain, spinal marrow, etc."

So, in the interests of general health and comfort, well-shaped and strong feet are necessary. Yet how often do we find that these feet—so wonderfully made, so exquisitely fashioned, and on which so much depends—are so often ill-treated and abused by unsuitable footwear, faulty standing and walking, posture, and lack of exercise?

Result of Ill-treatment

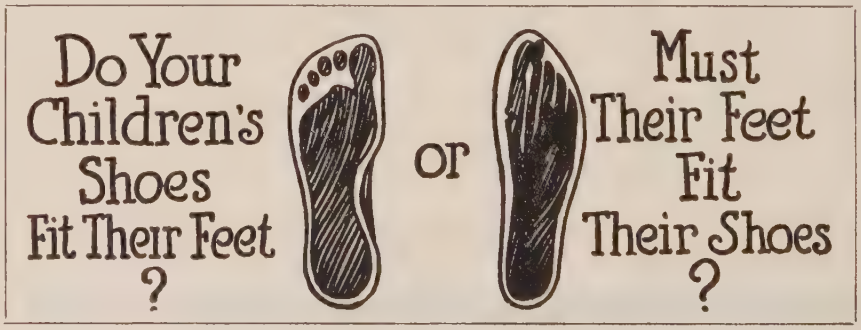
What is the result of such treatment? Disabilities of the foot and ankle are caused by conditions disturbing the balance of the body, and therefore give rise to complaint of weakness or pain from undue strain of such structures as ligatures and joint capsules, or undue pressure on bony structures and the parts covering them. It must be remembered that such disabilities may lead to general ill-health.

It is almost impossible to wear a faulty shoe without paying some penalty. Stubborn cases of headache, backache, continued fatigue, or poor circulation may have their origin in the feet. The body rests upon its feet, just as a high building rests upon its foundations. If a stone slips out of place in the foundation a crack may appear in the topmost ceiling. If the feet become weakened or flattened a person is likely to feel the effects in a remote part of his body.

Injurious Styles

We ridicule the old Chinese custom of binding women's feet, but inconsistently we are inclined to tolerate styles that are unnatural and injurious. Shoes or boots should conform to the natural foot lines, and should be sufficiently long and broad to permit toe spread and forward drive. Low, or moderately low, heels are the best; high heels interfere with stability, and often result in a mincing and ungainly gait. There may be some persons who can wear high heels without injury or discomfort, but usually there comes a time during or after middle life when both feet and body rebel against unnatural treatment and develop ailments of many kinds.

It should be bad form and unfashionable to adopt any form of footwear which disables women. A fairly heavy sole is usually preferable to a light one, and rubber heels are desirable for walking on hard city pavements. Learn to select shoes with care, and take plenty of time in buying them. Try on both shoes of a



pair. Stand your weight entirely on one foot and then on the other.

The wearing of proper shoes, however, is not the only requisite of perfect foot health. The feet should have plenty of exercise. Disuse is as bad as misuse.

Children's Feet

A wise mother knows that the child she loves requires sunlight and fresh air and proper food, and a wise mother knows that during infancy and childhood the necessity for proper foot hygiene is important if defects are to be prevented later in life. Many children are permitted to go through childhood handicapped by weak feet which, in the majority of instances, would respond to very simple corrective measures.

Normal children, when left to themselves, usually begin to creep during the eighth or ninth month. The should by all means be encouraged, as it trains the bones, joints, and muscles to bear weight. After this creeping period comes a more trying period, that of walking. The transition from the former to the latter should be natural.

When children are taught to stand on their feet too early the untrained muscles, bones, and ligaments yield to the overweight; deformities of the foot are produced that may lead to the marked degree of deformity which we see in weak feet. As with adults, the shoes for children should have broad toes and be roomy enough to permit of free action of small muscles of the feet. It is very important to wear stockings which fit well. Stockings which are too tight or too small will cramp the foot and in that way interfere with the proper action of the muscles of the feet, thereby predisposing the child to weak feet.

Gait of Children

The gait of children who have weak feet is awkward. They walk upon the centre of the sole of the foot. The toes turn out, and the soles and heels of the shoes are worn out in the inner borders. The feet of children should be examined frequently and carefully and where there is any suspicion of weakness or a tendency towards weakness expert advice should be sought and remedial measures immediately instituted.

Sandals may be worn by young children. Patent-leather shoes are not desirable, as they are inclined to make the feet sweat. They should not be worn very long at a time, if at all. Gumboots are useful in wet weather, but it is not advisable to wear them for long periods, as the rubber prevents the evaporation of perspiration, which makes the feet unhealthy.

If possible, shoes should vary in thickness according to the kind of exercise taken. It must not be forgotten that children's feet grow very quickly, and the fact they have outgrown their shoes may be overlooked. Children's shoes should be kept in good repair. If a child's shoes and stockings get wet they should be changed as soon as possible.

A continuous complaint of aching feet requires investigation by a doctor, as it suggests that the arches of the feet may have become weak, and special exercises and treatment will be necessary to put the matter right.

Corns

Corns can be accounted for by badly-fitting boots. Remove the cause for the corns, and the corns themselves will disappear with a speed and sureness equal to the claims of any "corn cure" advertisement. Renew the cause, and the corns will also reappear.

The American humorist, Josh Billings, feelingly wrote on this subject:

"I would just like to know the man who first invented tight boots. He must have been a narrow-minded contracted cuss. If he still lives, I hope he has repented of his sins, or is enjoying great agony of some kind. . . . Any man who can wear a pair of tight boots and be humble and penitent and not indulge in profane literature will make a good husband! Oh for the strength of Hercules to tear into shoe-strings all the tight boots of creation and scatter them to the eight winds of heaven! Oh for the beauty of Venus to make a big foot look handsome without a tight boot on it! Oh for the patience of Job to nurse a tight boot and bless it and even pray for a size smaller and more pinchful! I have been led into the above assortment of 'Oh's' from having in my possession at this moment a pair of number nine boots with a pair of number eleven feet in them. My feet are as uneasy as a dog's nose the first time he wears a muzzle. I think my feet will eventually choke the boots to death. I live in hopes they will. I suppose I have lived long enough not to be fooled again in this way, but I have found that an ounce of vanity weighs more than a pound of reason, especialy when a man mistakes a big foot for a small one!"

Bunions

Another inconvenience definitely arising from too-tight boots is the ingrowing toe nail. Chilblains may be welcomed as almost the only common foot defect which is not directly due to boots, and even these are not always negligible. Where tight boots are partly responsible, they must, of course, be remedied.

Bunions are among the most common of the evils induced by pointed shoes. Where the narrowness across the toes is excessive the foot may, in its desperate attempts to lessen its bulk, cause the great toe to become pushed under the second—a tendency which, if the boot is short as well as narrow, will result in the second toe doubling upon itself in an upward direction, with the formation of what is known as "hammer" or "trigger" toe.

Callouses are produced on the sole under the ball of the foot, due to the forcing of the foot upwards by high heels and the weakening of the transverse arch by interference with the functions of the small toes.

Flatfoot

Another condition induced by misuse of the feet is that of "flatfoot," and with it a frequent accompanying *rigidus."* Flatfoot is produced by the state of rigid toe known as *"hallux* crippling of the muscles supporting the arch. Cases of this painful affliction have been stopped by using thicker boots, with a correspondingly greater support to all parts of the foot, but in its later stages, while much may be done by cold bathing, stimulating linaments and tiptoe exercises, there is frequently required a definite supporting arch in the boot.

The rigid great toe readily arises from flatfoot, and in the latter the foot lengthens from behind by the collapsing of the arch. The great toe is driven forward correspondingly, meets usually the rigid leather of a too-short boot and, since it cannot double back (as in "hammer" toe), the point beneath the ball of the foot becomes pressed upon and irritated, and, as a result, finally ankylosed.

Exercise

Walking is excellent as a general exercise for the body, but it is especially good for the muscles of the legs and feet. Unless the feet are badly strained or weakened, walking will probably be the only exercise they will need, but if symptoms of flatfoot or fallen arches have developed, medical advice should be obtained. Rest, massage, and proper exercises will usually restore the arch to normal.

As a large amount of perspiration is given off by the sweat glands on the soles of the feet, even in the coldest weather, this, together with the scales which collect in the spaces between the toes, must be daily removed by washing; otherwise the feet rapidly become offensive.

Soldiers' Feet

Authorities on military hygiene stress the importance of well-fitted boots and socks and clean feet for the prevention of injury to the feet by marching. Regular bathing or cleansing of the feet with a wet cloth is advisable. Socks should be stretched when taken off to lessen their tendency to shrink. If there are tender parts of the feet the inside of the socks should be greased with soap where they fit over them.

Bathing the feet in a solution of formalin (one ounce with two pints of water) or methylated spirits relieves excessive sweating and tends to harden the feet. When blisters or chafes arise they must be appropriately treated; the blisters should be pricked with a sterilised needle.

Prolonged standing throws excessive strain on the feet, which should be combatted by rising on the heels occasionally and resting on the outer sides of the feet. Feet shod in damp leather suffer from double adverse exchange. They receive moisture from the ground, and lose heat to the ground. Everyone removes damp gloves on coming indoors. If persons with poor circulation always removed their outdoor shoes, like the French peasant, when they come into the house they would find it easier to keep warm.

Need for Attention

These feet of ours, formed to support and propel the human body throughout the long rough journey of life, so correlated to our pleasures, comfort, and health, need careful attention and humane treatment. There is nothing to compare with the beauty of health, which is enhanced by intelligent care of the feet.

How pleasing it is to see a young woman with a graceful deportment, the result partly of taking so much care of her feet as many a fine lady takes of her hands. Twenty years hence the same woman, in normal circumstances, will enjoy her walk and maintain a sensible balanced view of all which pertains to her health and joy in life.

Poets have rhymed in ecstasy over women's feet. The feet of Trilby, a central figure in Du Maurier's famous novel, were the admiration of the artists. It is wise, therefore, to contemplate in the design of the feet and to consider their care, not only for aesthetic reasons, but for the health of the body. The feet are organs of the human body just as much as the heart or lungs.

Book Review

"Wheat in New Zealand"

"Wheat in New Zealand," by F. W. Hilgendorf, M.A., D.Sc., F.R.S.N.Z., Director of the Wheat Research Institute, Department of Scientific and Industrial Research. 134 pages with 16 illustrations. Whitcombe & Tombs Ltd., Christchurch, New Zealand. Price 3/6.

The author of this little book has been too long associated with the wheat industry of New Zealand to require any introduction. Suffice it to say that by virtue of his personal knowledge and experience, plus his official position as Director of the Wheat Research Institute, he is more qualified than any other man to handle this subject.

The book has been written in the simple, easily-read style common to all publications by this author. The material is at the one time an historical record of the wheat industry of New Zealand, a very valuable source of information to the wheat grower of the present generation, and an excellent precis of what is being undertaken in the improvement of wheat and of its main final product—bread.

If one might presume to question the material included in—or rather excluded from—this book, one would draw attention to two points, namely: In the chapter on cultivation and harvesting, under the heading "manures" one would have appreciated a more definite recommendation in regard to the best rate of application of superphosphate. Hudson's results show that quantities greater than 1cwt per acre cannot, in general, be recommended. In view of the statement appearing inside the front cover of the book, due emphasis in the text of the book to this finding would have been of direct benefit to wheat growers.

In the same paragraph no record can be found of the advantages to be derived from the sowing of Government certified seed wheat which has been machine-dressed and pickled, nor does one find reference to the important part played by certification in the maintenance of varietal purity. The author is so well acquainted with this phase of the subject that its omission can only be regarded as an oversight.

Be that as it may, one must unreservedly recommend this book to all wheat growers in particular and in general to all persons interested in wheat or the products thereof, as filling a long-felt need in an admirable way.—J.H.C.

Under the recent subterranean clover strain variety trials in Hawke's Bay and during the spring inspection one outstanding feature was particularly noticeable between Mount Barker and Tallarook. The former, though a dense plant, seemed to be more erect in habitat. The Tallarook appeared to have very dense rosette plants and adhering close to the ground. Of the varieties under trial Mount Barker was well in flower, Tallarook had no signs of flowers, while Marlborough only showed one or two flowers, so it appears that Marlborough may be even a little later than the Mount Barker strain, although the growth and habitat of this variety are closely allied to Mount Barker.

Continued observations have been made on many farmers' crops of pampas grass, as well as two experimental areas. Success with this species has been obtained on several farms in the North Island, whereas in the South Island only a few plants have generally survived after planting. Pampas grass may prove particularly useful for wintering cattle on hill country on which the growing of normal supplementary crops is difficult, and several further experiments to investigate its possibilities in this direction are contemplated.

The Farm Home and Kitchen

Contributed by the Association for Country Education

The Health We Scorn

THE world's leading nutrition experts, assembled by the League of Nations to determine what is the most healthful diet possible, unanimously placed milk at the top of the list of essential foods because it is the most health-protective food of all.

They recommended that, following the milk diets of infancy, every child from two to three years should have 1 1-3 pints daily. By five years this should be increased to 1¾ pints daily, and should be kept at this amount until the growing period was passed at 25 years, after which "if necessary for reasons of economy, it might be decreased," but not below ½ pint per day. Pregnant or nursing mothers should keep to 1¾ pints per day. The average consumption of milk in New Zealand per man, woman, and child is 5-8 of a pint per head per day.

Is our health ideal? It is not! Can't we afford milk? We can! This stepping-stone to health is ours for the using. So why not use it?

Don't Scorn Skim Milk

When skimmed, mi'k loses only its fat content, and still retains all the other factors which make it such a valuable food—its minera's (lime and phosphorus), its body-building materials and its energy-giving carbohydrates.

Much better, then, for growing boys and girls to have porridge and milk for breakfast than for them to have porridge and cream !

Yet how many times do we find an abundance of cream on our tables while the most valuable part of the milk goes to feed the calves !

Best Foundation

Milk is the best possible foundation for an adequate diet, and therefore surely worthy of our attention and study, for at least New Zealand is a dairying country. But, unfortunately, we are not a milk-drinking people. Is it because we are more intent on the size of the factory cheque than upon the condition of our own and the children's teeth, or on the occurence of rickets or poor bone-formation? Surely not!

"A pint of milk per day, is after all, a lot easier to take — and to pay for — than doctors' medicines."

We are told very clearly that in order to have strong disease-resisting bodies we must supply **at least** one pint of milk per day for each adult and one and a half pints per day for each child. The average consumption per head of the population of New Zealand is less than three-quarters of a pint per day! Is the answer for this disobedience found in the poor state of our teeth and in various other physical ailments?

Growing Things Need Milk

We are all agreed that growing things need milk—our own babies, calves, puppies, etc. From the human standpoint, we so often find that as soon as children are old enough to eat "grown-up" food (in which we often forget to include milk) their allowance of milk is allowed to be reduced because we hear them say, "I don't like milk," or some such statement.

Babies are not born with marked likes and dislikes, and this fact must be remembered, but imitation is one of the earliest instincts to make itself evident, and that is where our responsibility as "patterns" lies. This "dislike" of milk is usually attributed to imitation by the child from his surroundings and not to a personal distaste for the best food Nature has provided, and for which there is definitely no substitute.

Milk for Adults

"The right or wrong food makes as much difference to the 'pep' and energy of adults as of children. The 'maintenance' of health for adults requires essentially the same food elements as the 'building' of health during childhood.

" No better plan for the meals of a family, regardless of its make-up, can be found than by using generously the two groups of foods—milk and its products, and fruit and vegetables.

" If meals are planned around these foods other articles can be chosen according to personal taste and the amount of the 'foods' allowance."

—Nutrition News.

GINGER MILK.

Milk, 1 cup. Golden syrup, 1 tablespoonful. Ginger, ¼ teaspoonful.

Method: Mix the ginger with the syrup. Add hot milk and reheat. Serve piping hot.

Attractive Ways of Serving Milk

TO help you to make sure of getting the daily milk requirement into the family menu, especially for those who don't like milk, the following recipes are offered:—

ORANGE MILK.

Milk, ¾ cup. Sugar, ½ tablespoonful (according to acidity of orange). Juice of ½ an orange. Crushed ice.

Method: Add sugar to the orange juice. Add crushed ice and milk and place in a glass jar. Shake thoroughly and serve immediately.

CHOCOLATE MILK.

Milk, ¾ cup. Grated chocolate (or cocoa), ½ teaspoon. Sugar, 1 teaspoon.

Method: Mix the chocolate with the sugar. Add a little hot milk and cook for a few minutes over the fire; then add the remainder of the milk. Bring to simmering point and let stand over hot water. Beat with a rotary beater and serve immediately.

COFFEE-MILK "NOG."

Eggs, 2. Sugar, 4 tablespoons. Strained black coffee, ½ cup. Milk, 2 cups. Vanilla, ½ teaspoon.

Method: Beat eggs to a light froth. Heat milk, coffee, and sugar. Add vanilla and stir into beaten eggs and beat with a rotary egg beater. Pour into glasses and serve with a little whipped cream and dust lightly with cinnamon.

MILK JELLY.

Milk, 1 cup. Gelatin, 1 teaspoonful. Sugar, 2 tablespoons. Flavouring.

Method: Soak gelatin in just sufficient cold water to cover. Then add the milk and sugar. Stir over a very moderate heat until gelatin is melted. Add flavouring, pour into wet moulds and put aside to set.

Note: For flavouring, the thinly-peeled rind of an orange, cinnamon bark, vanilla, or ginger root may be added while cooking and then strained out. Variety can also be obtained by adding any fruit juice or essence. or by using milk flavoured with cocoa or coffee.

WHITE SAUCES.

	Milk	Flour	Fat	Uses
	Cup	Tablespoons	Tablespoons	
Thin	1	1	1	Soups
Medium	1	2	2	Sauches
Thick	1	3	3	Basis Souffles, Croquettes, etc.
		4	4	

Method: Melt butter or dripping in upper part of double boiler (in saucepan over hot water). Stir in flour and cook until smooth and creamy. Add milk gradually. Stir all the time. Season and continue cooking over hot water until sauce is thick, and the starch thoroughly cooked.

CREAM OF VEGETABLE SOUPS.

Fat (butter or dripping), 2 tablespoons. Flour, 2 tablespoons. Milk (or milk and vegetable broth), 2 cups. Vegetable puree.

Method: Make a white sauce, using fat, flour, and milk, according to method given above. To this white sauce add any vegetable puree. (Purees are made by cooking any vegetable until thoroughly done, seasoning with salt, pepper, and suitable herbs, and forcing through a strainer. Carrots, swedes, potatoes, onions, celery, tomatoes, artichokes are all suitable.)

VEGETABLE CUSTARD.

According to season and the vegetables on hand, combine the cooked vegetables cut into small dice. (Potatoes, carrots, swede turnips, peas, beans, etc.) Pour over these a custard mixture, using:—

Milk, 1 pint. Eggs, 3. Salt and pepper.

Stand the baking dish or casserole in a pan containing cold water and bake in a moderate oven (350deg. F.) until custard is set.

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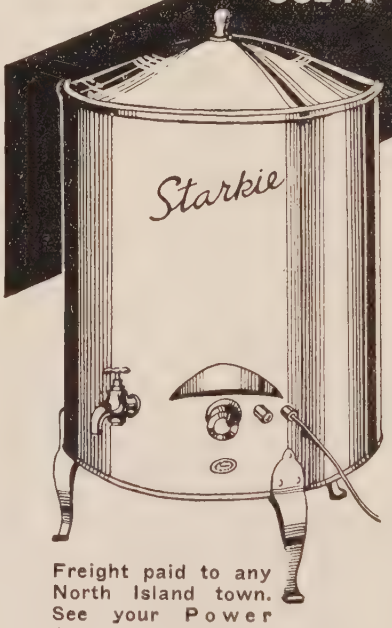

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"STARKIE" FOR HOT WATER

Facilities for Farmers' Wives and Children Visiting the Centennial Exhibition

FARMERS' wives with young children who are thinking of visiting the Centennial Exhibition will find capable attendants to take care of their children while they inspect the attractions. The facilities for mothers with infants and young children visiting the Exhibition include a nursery and a kindergarten. The nursery, which is the official name of the Red Cross Creche, is directly opposite the Tirangi Road entrance to the Exhibition. It is the headquarters for an important service provided for mothers and infants within the grounds. The New Zealand Red Cross Society is controlling the creche, which is a self-contained nursery building completely equipped and comfortably furnished. A Red Cross nurse and Red Cross Voluntary Aid Detachment members, who have special training in mothercraft, will supervise the nursery.

Playrooms for children crawling and toddling are included in the building, as well as a dormitory with cribs for small visitors. The building has its own kitchen, containing a stove, a steriliser, and a refrigerator, so that every facility is available for preparing meals. The walls are painted with birds, animals, and nursery rhyme pictures to make it as attractive and colourful as possible. Sliding glass panels between the various playrooms ensure a thorough supervision of all the children. The personal belongings of mothers and their children may be left in special lockers to be kept in safe custody.

The service of the creche is available for mothers with children up to the age of four years. The mother has to certify as to the type of feeding and other details, and to state that the child has not suffered from any infectious disease during the 21 days before their visit. The creche will be open from 10 a.m. to 5.30 p.m. each day, and the charges will be 6d for the first hour, and 3d for each successive hour, or 2s for one whole day.

Kindergarten

A model kindergarten building, specially designed and furnished, will be available for older children. This building is next to the nursery. Here, children may be left in the hands of capable trained assistants, and the kindergarten is under the control of the New Zealand Free Kindergarten Union.

Special children's furniture and up-to-date equipment, as used in kindergarten work today, will be in use, and the assistants, as well as supervising the play of the children, will answer questions regarding the training and education of the young.

Of special interest to country visitors will be the display of simple toys on sale at the kindergarten. Every attention will be given to country mothers to assist them with advice in their choice, if making any purchases.

Plunket Rooms

The Royal New Zealand Society for the Health of Women and Children (commonly known as the Plunket Society) also have a special building within the Exhibition grounds. This is a model Plunket room advice centre typical of their centres throughout New Zealand. It will provide for mothers visiting the Exhibition facilities for advice concerning their own health and that of their babies and small children. A consulting room is included in the building, where babies and pre-school children can be examined, and where the normal Plunket room facilities will be in operation.

A pre-school room will contain furniture, clothing, play material, model diets, etc., suitable for the child aged from two to five years. A pram parking area and toilet accommodation for the convenience of mothers is another feature of the Plunket Society's exhibit. The service will be in charge of trained Plunket nurses, who will be in attendance daily from 10 a.m. to 4 p.m. for the purpose of seeing babies and pre-school children, but adults will be interviewed until 9 p.m. The advice given is free to all.

How to Get Accommodation

In response to an appeal by the Mayor of Wellington, householders in the Capital City have made a fine response to solve the problem of accommodating the thousands of visitors expected. From November 8 to the first week in May the Exhibition will be open, and during that period the capacity of boarding-houses and hotels will not be able to cater for the holiday population. The result of the Mayor's appeal for the accommodation of visitors in private homes has been the listing of some 4000 names and the provision of approximately 5000 beds.

Complete information on accommodation and how to get it has been distributed throughout New Zealand. Printed pamphlets stating the types of board and the rates to be charged can be procured at all post offices and railway stations. The main issue now, as far as the Accommodation Bureau is concerned, is to get intending visitors to appreciate the necessity of making application for their accommodation. If early application is made, the best use of the facilities offering will be possible.

As well as private accommodation, the Exhibition Hotel and the Centennial Guest House will help to ease the problem in Wellington. Both of these buildings have been specially erected to accommodate visitors to the Exhibition. Appreciating the difficulty that will face many intending visitors to Wellington, in that they will not be able to make personal inspection or inquiries, the official Accommodation Bureau fulfils this need. All the bookings made by the bureau are made with a full knowledge of the conditions and conveniences in each case, and each home listed on the bureau's books has been inspected.

A Balanced Menu

NOW is a good time to make a fresh, new start in this business of feeding the family good food. Resolve to work for less finickiness and more of the gospel of the clean plate—a big conserver of time, money, health, and disposition. Turn a deaf ear to the chronic "don't-like-that-ers." As someone said, "It isn't what's in the menu, it what's in the child."

Here is an example of a well-balanced day's menu:—

Breakfast.—Baked apple, porridge, scrambled egg, milk and tea.

Dinner.—Pot roast of beef, browned potatoes, buttered onions, lettuce with French dressing; prune whip with custard sauce.

Lunch or Tea.—Scalloped oysters, raw celery, honeyed raw peaches, bran gems, milk and tea.

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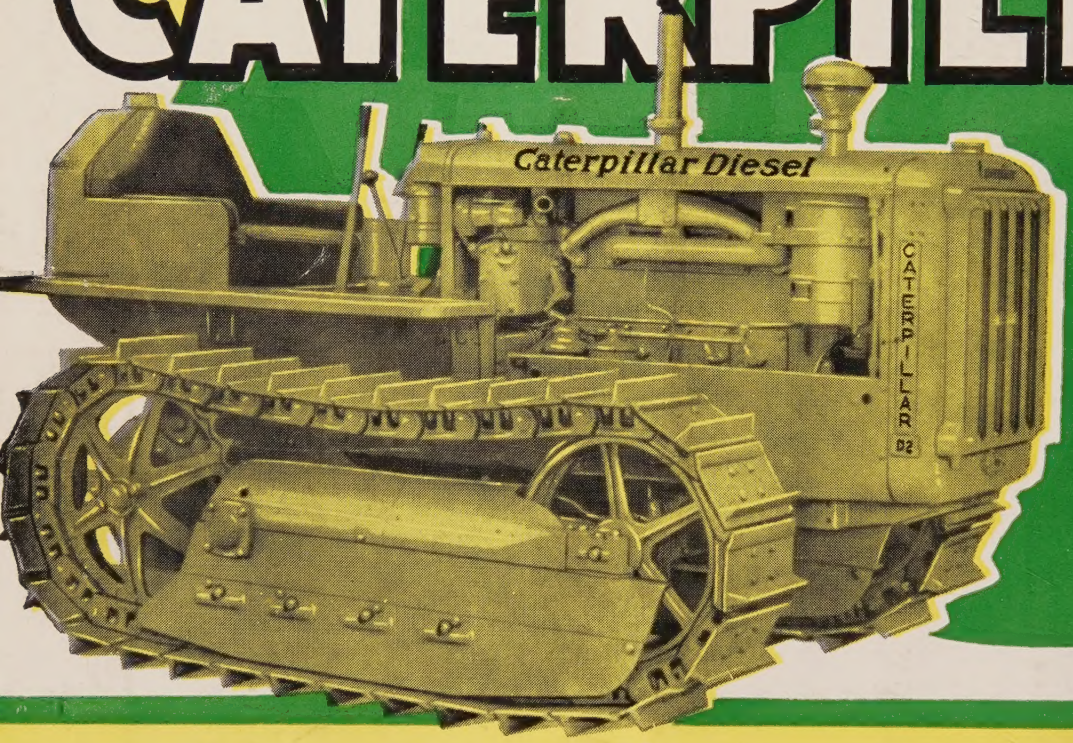

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